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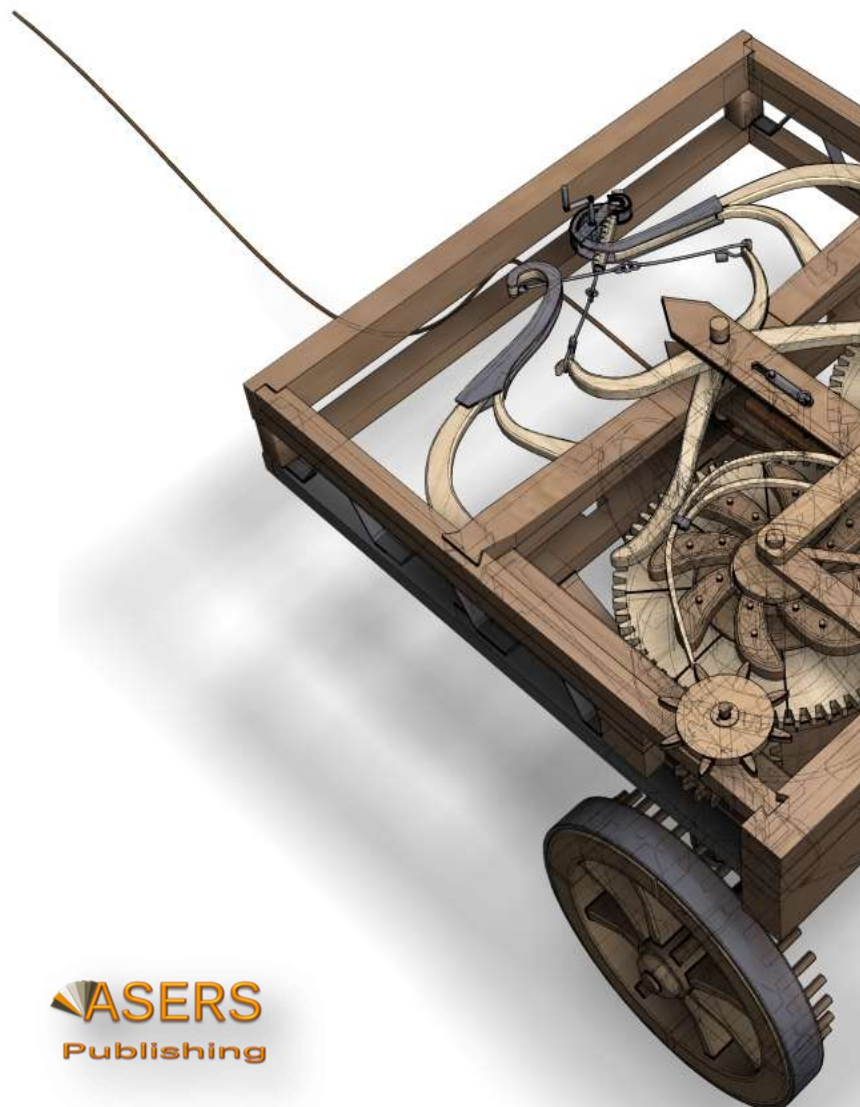
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Theoretical and Practical Research in Economic Fields



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THE BREXIT HAMMER: REPERCUSSIONS FOR THE US AND TRANSATLANTIC RELATIONS IN TIMES OF CORONA

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Abstract:

The global revival of economic nationalism and protectionism poses a serious threat to the international foreign trade policy orientation towards principles of a market economy. Popular economic nationalism such as Trumpism, Brexit or the isolation of the Eastern European Visegrád states from immigrants violates fundamental principles of the WTO. Economists agree that Brexit will hurt the UK economy significantly in the medium and long term. In addition, its political and economic effects will damage the US and transatlantic relations. British Prime Minister Boris Johnson, on the other hand, continues to claim that leaving the EU will enable Britain to "take back control". In addition, the socio-economic effects of the Corona crisis on the US, UK, EU and transatlantic relations are devastating. It has far-reaching political, social and economic consequences that go well beyond public health. All partners need each other more than ever to cope with the Covid crisis. Increased transatlantic cooperation to strengthen resilience would also be necessary in closely related areas of international relations and security issues.

Keywords: Brexit; COVID-19-pandemic; USA; United Kingdom; transatlantic relations; Anglosphere.

JEL Classification: F13; F15; F22; F52; F68; I14; N10; N40; O24; O50; Z13.

Introduction

The British voted 52 % to 48 % in favour of leaving the European Union (EU) in a referendum on 23 June 2016. The Brexit rules in force since 31 January 2020 are likely to hurt the British economy in the medium and long term according to most economists and economist literature. Since the expiration of the transition period on 31 December 2020, the United Kingdom (UK) is no longer part of the European Union Customs Union and the European Single Market. Yet, the full scale of the damage, hitting trade and deepening labour shortages, is still uncertain, because the impact is overloaded by the economic effect of the Covid-19 pandemic¹. In the following, I should like to focus on the combined impact of Brexit and the COVID-19 pandemic on the US and transatlantic relations. The revival of popular economic nationalism and protection like Brexit, Trumpism and the foreclosure of the East-European Visegrád countries against migrants, constitutes a serious threat to free trade and free markets worldwide. It will weaken especially the Western hemisphere that up to now upheld, if not guaranteed, economic liberal positions in world trade. Furthermore, the socio-economic impact of the Corona crisis on the US and transatlantic relations has been devastating far beyond public health.

¹ Giles, Chris (2021) Covid pandemic masks Brexit impact on UK economy. London. Financial Times, 1 July 2021

Enhanced transatlantic cooperation to strengthen resilience would be required also in closely related areas of international relations and security issues.

1. Impact of Brexit and the COVID-19 Crisis on the USA

1.1 The impact of Brexit on the USA

The Brexit effects became visible first concerning the trade in goods. But the estimated impact depends largely on which statistics are used. According to the UK's Office for National Statistics (ONS), exports to the EU were 5 % lower in April 2021 than last December but cut by 24 % when measured by Eurostat over the same period². Likewise, the value of imports of trade in goods from the EU to the UK was 19 % down over the same period, according to the ONS, while Eurostat recorded only a 13 % decline.

Brexit induced deregulation could benefit businesses only to a limited extent because the UK had already the second-lowest value of the OECD Product Market Regulation and held the 6th position in the World Bank's Doing Business ranking. The regulation of network industries was the least restrictive among OECD countries³. Nonetheless, in August 2021, London announced that it wanted to restrict the endless cookie notices and consents on the Internet, demanded by the European General Data Protection Regulation (GDPR) and therefore reject a European set of rules for the first time after leaving the EU⁴. There was concern in Brussels that this might only be the beginning of further deregulations which would assure the UK an unfair competitive edge in international relations.

Yet, economists generally agree about the long term Brexit effects, e.g. about a reduction of British GDP by about 4 %, compared with remaining inside the EU. For the years to come, much depends on the degree of supply chain ruptures between Britain and the EU-27 as well as the extent to which the UK becomes less attractive to investors.

Moreover, the new restrictions concerning labour movement, introduced with Brexit, limiting the rights of EU citizens to come and work in Britain, raised concerns about labour shortages (Giles 2021). Though, here again, it is difficult to differentiate. Labour shortages resulted from an impact mix of the Covid-crisis and Brexit. There were similar trends observed in other EU countries which suggested that it was not solely a Brexit effect. Employers had to realize in some sectors such as social care that the times when they could expect labour to be freely available were over and that on the contrary, they needed to pay more to ensure available staff.⁵

Advocates of Brexit like Premier Boris Johnson claimed that leaving the EU would enable Britain to "take back control." But then, the benefits of Brexit for the UK are not evident either. London rapidly rolled over many trade agreements with countries that already had dealt with the EU. The then foreign affairs minister, Boris Johnson, promised already before the Brexit vote in 2016 a 'titanic success' of the envisaged CANZUK union with the former white settler colonies of the British empire, meant to replace the lost EU market⁶. However, economists are sceptical about the positive net effect of the deal. Even the British government's impact assessment suggested a total gain of just 0.02 % in the long run⁷.

End of August 2021 disturbing news about UK's lorry driver shortage hit the public. The shortage could push food prices higher and that at a high time of business before Christmas. The shortage could hit transport and storage firms lagging in the recovery as well as consumer-facing firms and the farm sector that had been complaining already about labour shortages because of the lockout of migrant seasonal labourers Eastern Europe by Brexit. Moreover, British car production slumped to lowest July since 1956⁸. Thus, the cost of moving home rose as British removals firms put up prices up to 25 % as firms cover wage increases to attract staff amid post-Brexit lorry driver shortages⁹.

² Giles, Chris (2021) Covid pandemic masks Brexit impact on UK economy. London. Financial Times, 1 July 2021

³ Kierzenkowski, Rafal and Nigel Pain and Elena Rusticelli and Sanne Zwart (2016) The Economic Consequences of Brexit: A Taxing Decision. OECD Economic Policy Papers

⁴ Hern, Alex (2021) UK to overhaul privacy rules in post-Brexit departure from GDPR. The Guardian (London), 26 Aug 2021

⁵ Giles, Chris (2021) Covid pandemic masks Brexit impact on UK economy. London. Financial Times, 1 July 2021

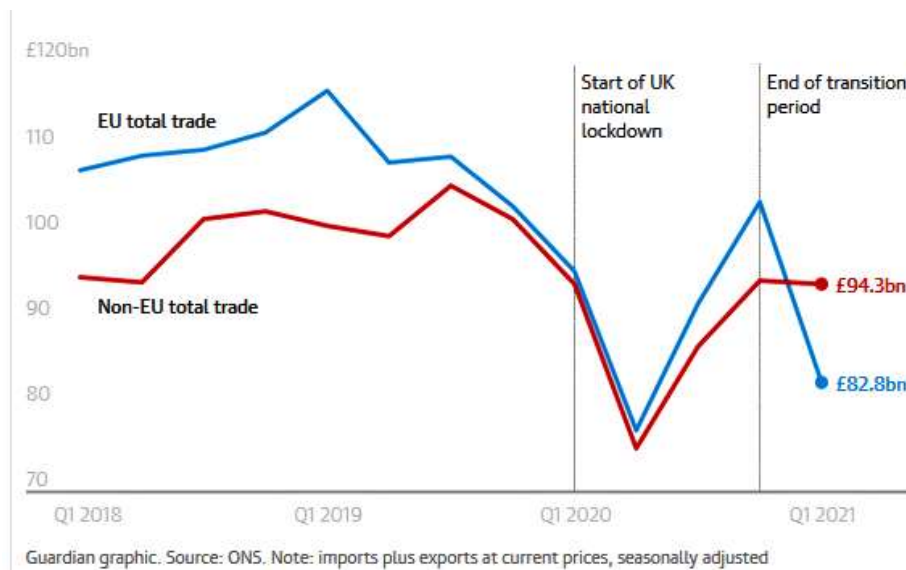
⁶ Kohnert, Dirk (2021): Brexit and CANZUK: expectations versus realities. BLOG, UK-in-a-Changing-Europe, 8. July 2021

⁷ Giles, Chris (2021) Covid pandemic masks Brexit impact on UK economy. London. Financial Times, 1 July 2021

⁸ Wearden, Graeme (2021): UK's lorry driver shortage 'could push food prices up', as supply chain crisis hits confidence – as it happened. The Guardian (London), 26 Aug 2021

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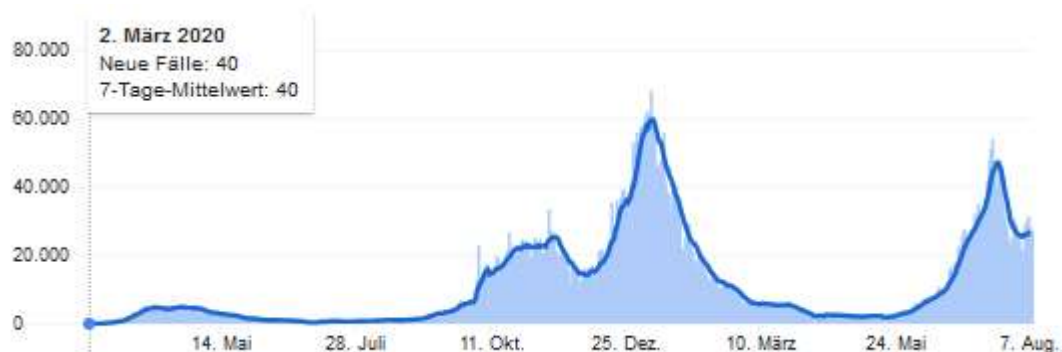
Figure 1. Post-Brexit UK trade in goods with non-EU countries surpassed that with EU, 1st quarter 2021



Source: [The Guardian](#), Partington, 2021

However, recently the British got amazed about a perceived 'Corona miracle'. When Boris Johnson confirmed the end of almost all COVID-19 restrictions on 19 July 2021, gloomy forecasts were abounding. Epidemiologist Neil Ferguson from the Imperial College London, a member of the Covid advisory board SAGE, warned that an increase to 100,000 or even 200,000 new infections per day would be almost inevitable¹⁰. Yet, infections up to now did not increase substantially. On the contrary, at the beginning of August 2021, almost 22,000 new infections were reported and hospital admissions, as well as death, also increased only moderately since July.

Figure 2. Confirmed COVID-cases in the UK, March 2020 to August 2021



Source: [UK COVID-19, google news](#). Data Source: John Hopkins Univ.

Yet, the question remains if the protection by the high vaccination rate of the British will last. Almost 73 % of adults received two doses of the vaccine and 89 % one dose. According to the British [Office for National Statistics](#) (ONS) in [Newport \(Wales\)](#), nine out of ten adults have antibodies against Covid, either because they have been vaccinated or have recovered. Moreover, the UK is likely to start a marvellous economic recovery. According to IMF forecasts Britain will show one of the world's highest growth rates with about 7 % in 2021.

Butler, Sarah (2021) Cost of moving home rises as UK removals firms put up prices. London: The Guardian (London), 1 Aug 2021

¹⁰ Plickert, Philip (2021) Briten staunen über mögliches 'Corona-Wunder'. Frankfurter Allgemeine Zeitung (faz), 4 August 2021. English translation by Hall, Susan (2021): Corona in Great Britain: British are amazed at "Corona miracle". Fuzzy Skunk, 4 August 2021

Thus, the pre-COVID-19 crisis level could be reached again by the end of 2021 according to the Bank of England¹¹.

The worldwide revival of popular economic nationalism and protection is a serious threat to the internationally shared policy orientation on foreign trade on the principles of a market economy. This preference had generally prevailed since the end of World War II, e.g. concerning the WTO, founded in 1995, its predecessor, the General Agreement on Tariffs and Trade (GATT, 1948), as well as the OECD, established in 1961 by 38 high-income economies. The consensus had been justified by two assumptions of economic theory: first, the Ricardian theory of comparative advantage and second, a central theorem of international relations, namely the notion that the removal of trade barriers would promote a positive correlative relationship between economic integration, development and peace¹².

Popular economic nationalism, like Trumpism, Brexit or the foreclosure of the four East-European Visegrád countries against immigrants arguably contravenes against the following five fundamental WTO principles:

1. Non-discrimination, including the most favoured nation (MFN) rule and the national treatment policy, was introduced to tackle non-tariff barriers to trade.

2. Reciprocity, to limit the scope of free-riding and a desire to obtain better access to foreign markets, providing that the gain would be greater than the gain available from unilateral liberalization.

3. Binding and enforceable commitments.

4. Transparency through the Trade Policy Review Mechanism (TPRM)

5. Safety values applying in specific circumstances to restrict free trade, e.g. to protect the environment and public health (WTO, Wikipedia).

London's Brexit decision and Donald Trump's aggressive position toward the WTO¹³ were likely to restrict the free world market consensus. Besides, both encouraged populist political national isolation worldwide¹⁴.

Britain is a major US trade and economic ally. It is the largest trading partner by country, accounting for 16.7 % of total UK trade, while the EU is its largest overall partner. Moreover, foreign direct investment (FDI) and connected activities are key aspects of bilateral ties¹⁵ (Akhtar *et al.* 2021). The Brexit required not only a new EU trade agreement with the UK but also a new US-UK free trade agreement. Britain's withdrawal from the EU caused uncertainty for American firms exporting and operating in the UK, given the high degree of interdependence between EU and UK trade and investment and the role of the UK as a stepping stone to the EU market. Although many American enterprises were relieved that, after years of uncertainty, London and Brussels had finally avoided a 'hard Brexit' and did not fall back on WTO terms, many US enterprises in Britain had already begun restructuring their operations due to Brexit. Experts expected post-Brexit UK's growth to shrink in the long-term, compared with Britain remaining in the EU, this the more so, because of additional negative effects of the Corona crisis (Akhtar *et al.* 2021).

According to a recent evaluation by the Congressional Research Service (CRS), the UK is likely to remain one of its closest and most reliable allies of the US, a partnership based on common history, values, language and culture. According to the study, Brexit would be unlikely to cause any drastic overhaul of the general British – American relationship. It would continue for the foreseeable future, not only in economic issues, but also concerning NATO, intelligence, counterterrorism, and other global and regional security challenges. Nevertheless, the CRS recognized a controversial debate about the question of whether Britain's global role and impact are likely to be improved or weakened by Brexit. Unlike President Donald Trump, an outspoken supporter of Brexit, former president Barack Obama, as well as current president Joe Biden and his

¹¹ Plickert, Philip (2021). Briten staunen über mögliches ‚Corona-Wunder‘. Frankfurter Allgemeine Zeitung (faz), 4 August 2021. English translation by Hall, Susan (2021): Corona in Great Britain: British are amazed at "Corona miracle". Fuzzy Skunk, 4 August 2021

¹² Stacy, Sean (2021) Can a Complicated "Consensus" survive a dose of populist poison? Exploring the potential impact of Brexit and Trumpism on the developed country approach to trade. Law and Policy. Law and Development Review, 2021, <https://doi.org/10.1515/ldr-2021-0048>

¹³ Linscott, Mark (2020) The Trump administration's plan to upend the WTO. Atlantic Council, 18 June 2020

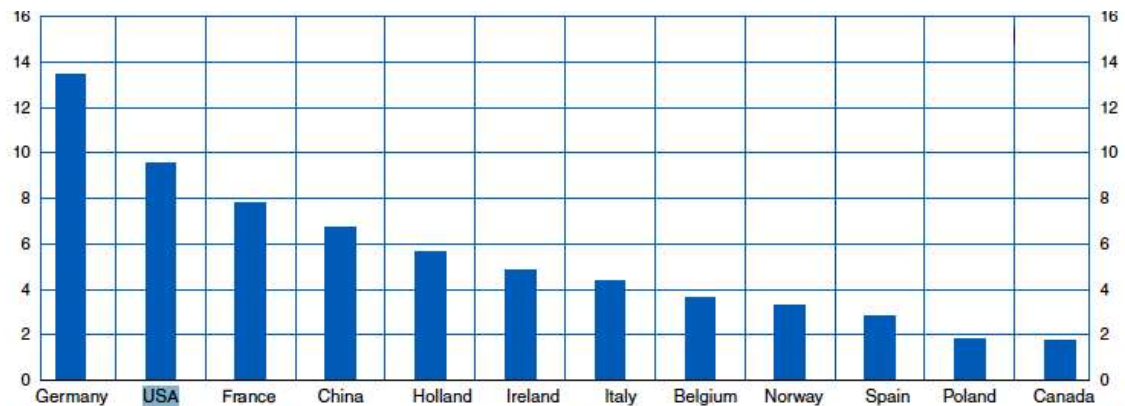
¹⁴ Stacy, Sean (2021) Can a Complicated "Consensus" survive a dose of populist poison? Exploring the potential impact of Brexit and Trumpism on the developed country approach to trade. Law and Policy. Law and Development Review, 2021, <https://doi.org/10.1515/ldr-2021-0048>

¹⁵ Akhtar, Shayerah I. and Rachel F. Fefer and Andres B. Schwarzenberg (2021) Brexit and outlook for a U.S.-UK Free Trade Agreement. In: Focus, Congressional Research Service (2021), updated 14 January 2021

administration, so far have been sceptical (Mix 2021). In 2020, Washington and London conducted five rounds of negotiations on a bilateral free trade agreement the negotiations are on-going.

As of 30 July 2021, total bilateral UK-US trade in goods and services (exports and imports) was £ 188.1 bn in the year to the end of the first quarter of 2021, a decrease of 17.8 % or £ 40.9 bn from the year before. Total UK exports to the US decreased by 17.7 %, total UK imports by 18.1%. In 2019, the outward stock of FDI from the UK in the US was £ 379.7 bn or 25.3 % of the total British outward FDI stock. The UK inward FDI stock was £ 381.6 bn, or 24.5% of the total inward stock (Trade and Investment factsheet, USA, DIT, London, 2021). British service industries were predominant.

Figure 3. Breakdown of UK imports by country and origin (in %)



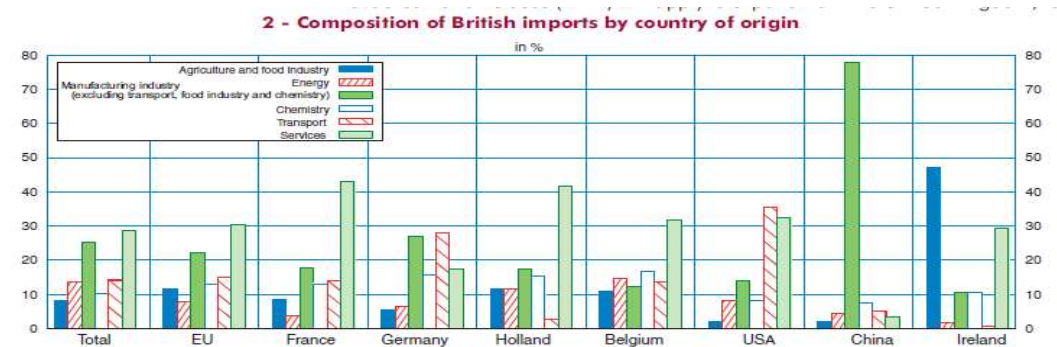
How to read it: in 2014, 13.4% of British imports came from Germany. The countries shown here are the 12 biggest exporters to the United Kingdom, in terms of their share of total British imports.

Sources: WIOD, INSEE

Source: Cornuet, F. et al (2019)

They accounted for 80 % of total economic output and more than 80 % of employment. The bilateral UK - US investment relationship is regarded as the biggest in the world.

Figure 4. Composition of UK imports and exports by country of origin



How to read it: In 2014, 35.6% of British imports from the USA were transport equipment, while the average for this category from all trading partners was 14.1%.

Sources: WIOD, INSEE



How to read it: In 2014, 11.4% of British exports were to the USA. The countries shown here are the 12 biggest buyers of British exports.

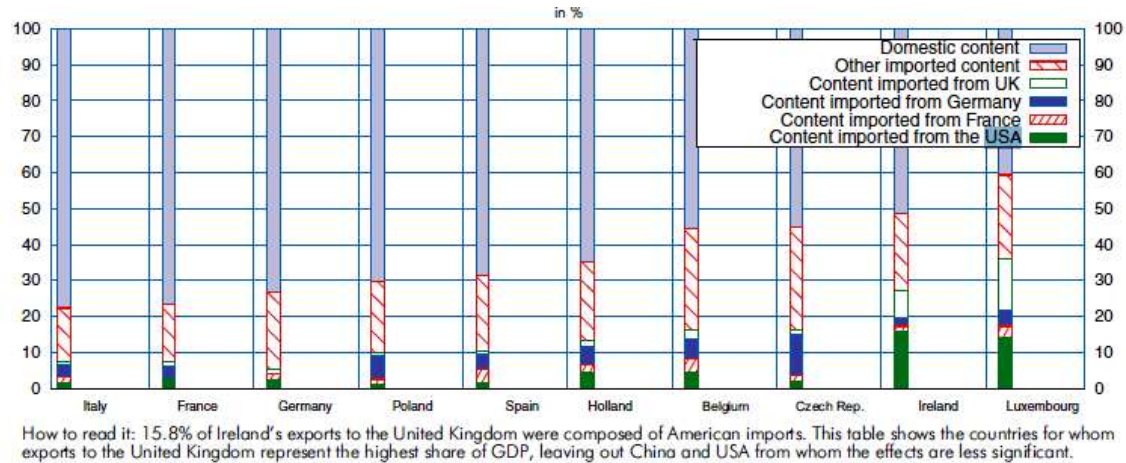
Sources: WIOD, INSEE

Source: Cornuet, F. et al. (2019) p. 40

The five leading export destinations in 2019 were the USA, Germany, Netherlands, France and Ireland, the principal five import countries, the USA, Germany, Netherlands, China and France ¹⁶.

London remained especially ambitious concerning security and defense issues. Britain and America were key partners in terms of defense industry cooperation and defense sales, counterterrorism and intelligence cooperation. Besides, they cooperate through the Five Eyes alliance, an intelligence partnership that includes Australia, Canada, and New Zealand. In 2020, the UK had - with approximately US\$ 61.5 bn - the world's fourth-largest military expenditure (behind the United States, China, and India)¹⁷.

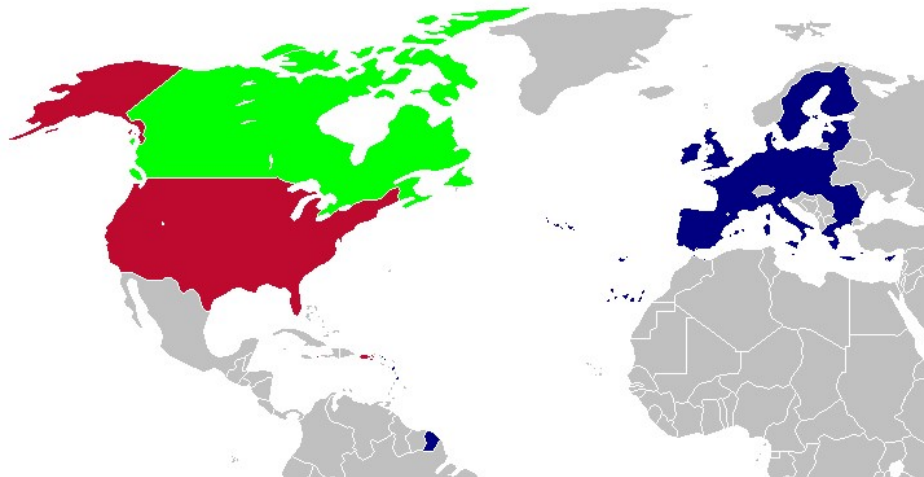
Figure 5. National & imported content of exports from trading partners to the UK



Source: Cornuet, F. *et al.* (2019), p. 41

Even if Brexit would restore Britain's former global importance, the geopolitical conditions have changed fundamentally. The high-flying illusions of the Brexiteers about a revival of the glory of imperial Britain would be difficult to realize. Although visions of 'Global Britain' form a common cultural inheritance, not just of Brexiteers, but of English voters in general, they tend to disregard the consequences of decolonization¹⁸.

Figure 6. Trans-Atlantic relations¹⁹



Source: [Transatlantic relations](#), Wikipedia

¹⁶ Mix, Derek E. (2021) The United Kingdom: Background, Brexit, and relations with the United States. Congressional Research Service, Nr. RL33105, 16 April 2021

¹⁷ Mix, Derek E. (2021) The United Kingdom: Background, Brexit, and relations with the United States. Congressional Research Service, Nr. RL33105, 16 April 2021

¹⁸ Saunders, Robert (2020) Brexit and Empire: 'Global Britain' and the Myth of Imperial Nostalgia. The Journal of Imperial and Commonwealth History, 48:6, 1140-1174

¹⁹ One possible definition of transatlantic relations. The US (in red), Canada (in green), the EU (before Brexit; in blue). European non-EU states, Latin America and Africa were excluded ([Transatlantic relations](#), Wikipedia).

Brexit not just weakened the EU but split and undermined the Western alliance too. This, the more so, as the Trans-Atlantic, the center of global geopolitics for centuries, moved slowly but surely to the Trans-Pacific. Certainly, London saw the writing on the wall and tried to reorientate its foreign policy. One consequence was that the British endorsed the idea of CANZUK, i.e. a union between the UK, and its former 'white settler colonies' Canada, Australia and New Zealand, to replace the lost access to the EU-27 market. The CANZUK was embedded in a vision of the revival of the olden days of Great Britain and its role in the 'Anglosphere', dating back to World War II and 19th-century British settler colonialism. However, it is rather doubtful whether the CANZUK will become the 'titanic success' which Boris Johnson promised already in 2016 when he still was minister of foreign affairs²⁰.

Apparently, the center of Britain's post-Brexit economic and political interests will remain in Europe, last, but not least, because of the implications for Northern Ireland and Scotland. Yet, with the split from the EU, London transmitted a seed of contention among Europeans. In fact, it weakened the very foundations of post-war European unification, the partial transfer of national sovereignty to attain a greater mutual impact. But also the remaining EU-27 has changed already substantially with the growth of nationalist populism in an increasing number of member states. In this respect, Brexit was arguably just an accelerant²¹.

Nevertheless, a less ambitious British government that would not concentrate on the restoration of a post-Brexit (imperial) 'Global Britain', could still play an eminent role in European foreign relations and world politics. Namely as a powerful permanent member of the UN Security Council and non-partisan mediator in international relations, equipped with a 'robust mandate'. Thereby London should focus on human rights, democratization and development assistance for least developed countries, in profiting from its strong international connections to most of the political leaders of the world.

Last, but not least, the paradoxical consequences of a new exclusive bilateral UK – US trade deal will probably provoke the erection of one of the major single trade barriers in current foreign trade history, quite to the contrary of London's repeated commitment to promoting free trade²².

Figure 7. *Trans-Pacific (TPP-11)*



Source: CPTPP / TPP-11, HARA KENZO ²³,

²⁰ Kohnert, Dirk (2021): Brexit and CANZUK: expectations versus realities. BLOG, UK-in-a-Changing-Europe, 8.July 2021

²¹ Bevington, Matt (2021) UK foreign policy beyond Brexit. Commentary, UK in a changing Europe. London, 28 January 2021, <https://ukandeu.ac.uk/uk-foreign-policy-beyond-brexit/>

²² Bevington, Matt (2021) UK foreign policy beyond Brexit. Commentary, UK in a changing Europe. London, 28 January 2021, <https://ukandeu.ac.uk/uk-foreign-policy-beyond-brexit/>

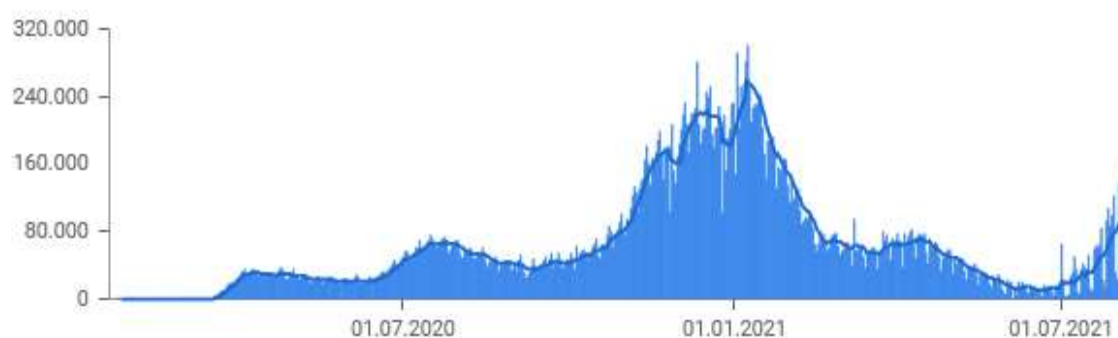
²³ [Comprehensive and Progressive Agreement for Trans-Pacific Partnership](#), created in January 2018 by its member states: [Australia](#), [Brunei](#), [Canada](#), [Chile](#), [Japan](#), [Malaysia](#), [Mexico](#), [New Zealand](#), [Peru](#), [Singapore](#), and [Vietnam](#). The TPP-11 evolved from the [Trans-Pacific Partnership](#) (TPP), which never entered into force due to the withdrawal of the United States under the Trump government. Other Pacific Rim countries including Korea, Thailand, the Philippines, and Taiwan

1.2. Impact of Brexit and the COVID-19 Crisis on the USA

What is to be expected from a future bilateral UK – US trade deal? Former President Trump, who was like-minded with the British Premier Johnson, had promised a 'phenomenal' post-Brexit deal. But it was by no means clear that Washington would honor the traditional 'special relationship' with one of its closest allies and agree to a mutually beneficial treaty. Here too, the maxim 'America first' prevailed²⁴. Washington wanted for example substantial access to the protected British agricultural market and to the cherished National Health Service (NHS) that was to be opened up to American pharmaceutical and medical companies. However, both demands would be to the detriment of British farmers and consumers, e.g. concerning transatlantic differences in product and food standards, and cause vehement protest of the concerned, notably because of the additional impact of the Corona crisis²⁵.

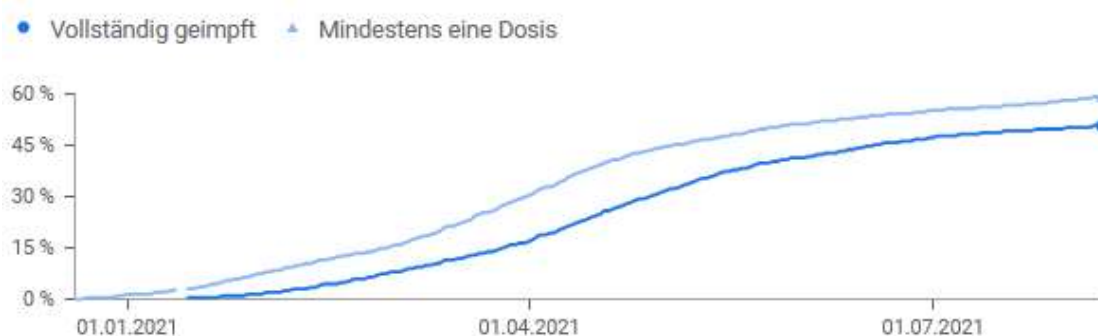
The Corona crisis created not just a public health calamity but an economic emergency too. As of 9 August 2021, there were a total of 35.812.164 COVID-19 confirmed cases, including 616.594 death, as well as 166.477.481 completely vaccinated people (50.5 %) (USA, COVID-19, google news). Thus, the pandemic claimed more than three times the American lives that were lost in the Vietnam war²⁶. As for the regional distribution the virus spread from the densely populated urban centers to more rural parts of the country. The most death was to be deplored in the South-East, South-West and the Far West. Concerning ethnicity, Blacks (African Americans; about 47 million or 14.2% of the total US population) and non-white Hispanos (1.5 m, 0.5%) had been affected most (see figure 13 and 15).

Figure 12. Confirmed COVID-cases USA, January 2020 to July 2021



Source: [USA COVID-19, google news](#), accessed: 9 August 2021

Figure 13. vaccinations USA as % of the total population, January 2021 to July 2021
(dark blue – completely vaccinated; light blue, one dose)



Source: [USA COVID-19, google news](#), accessed: 9 August 2021

also have an interest in the TPP Agreement and may participate in the TPP Agreement in the future. Source: Trans-Pacific Strategic Economic Partnership Agreement (TPP Agreement), [HARAKENZO](#), Intellectual Property Information.

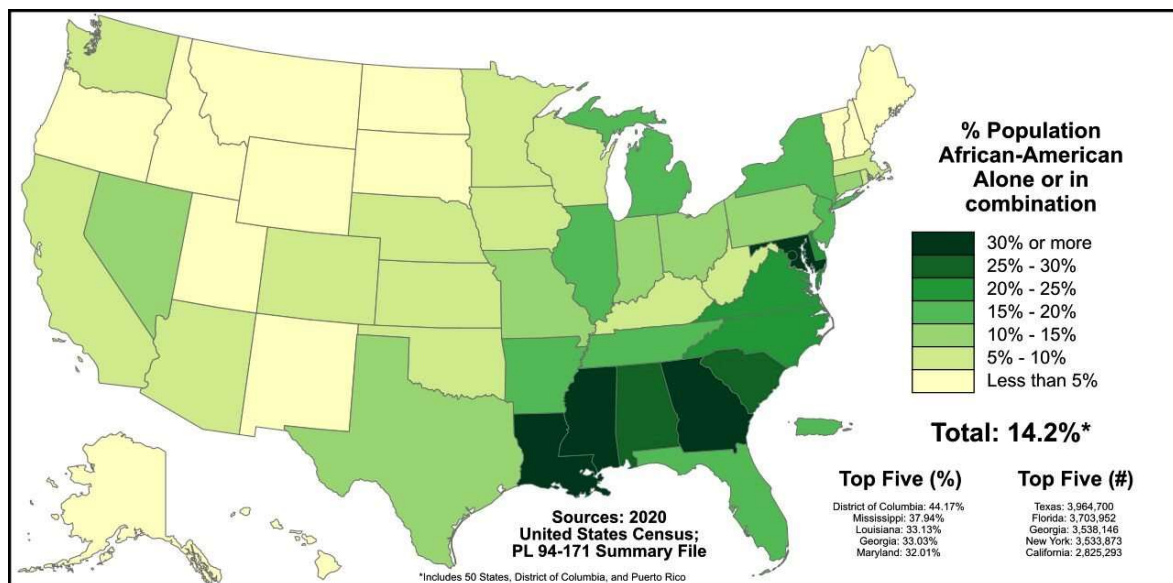
²⁴ Ellyatt, Holly (2019) What Brexit could mean for the US economy. CNBC

²⁵ Beverley-Smith, Huw and Christopher Jefferies (2020) Brexit: forging the New U.K.-U.S. relationship. Insights, Faegre Drinker Biddle & Reath LLP, 22 April 2020

²⁶ Bauer, Lauren et al (2020) Ten facts about COVID-19 and the U.S. economy. Brookings Institution, 17 September 2020

According to a scholarly analysis of the potential economic impact of the pandemic, the latent three most harmful sectors concerning the economic impact were manufacturing, professional services, as well as leisure and hospitality. The former two sectors showed the most sizable initial shocks according to a model calculation. The latter sector, although smaller in size, contributed roughly the same extent to the total output decrease because of its large initial shock. However, the authors of the analysis cautioned that the explanatory power of the modeling was limited because the impact of price- or wage changes as well as the possibility of failed industries was not considered. For regions in which no industries stopped working, the pandemic was likely to exert – according to the prognosis – a reduction of about 9 % of the sector's output, whereas the total American GDP fell by an annual rate of 31.7 % in the second quarter of 2020, which corresponded to a 9 % quarterly reduction. The latter corresponded with the data reported by the Bureau of Economic Analysis (BEA)²⁷. In March 2020 there was a sharp initial reduction of economic output, followed by a gradual recovery up to March 2021, reaching the pre-Corona levels.

Figure 13. Distribution of African-Americans in the USA



Source: U.S. Census Bureau's American Community Survey 2019; [African Americans](#), Wikipedia

Other things being equal, women and girls were affected disproportionately economically, impacting women's income, employment, and education chances. Moreover, they were burdened with the mounting pressure of unpaid care for their relatives and last, but not least, they suffered from gender-based violence²⁸.

According to an analysis of the Brookings Institution, the following ten facts marked the economic impact of the Corona crisis on the US economy in its initial stage²⁹:

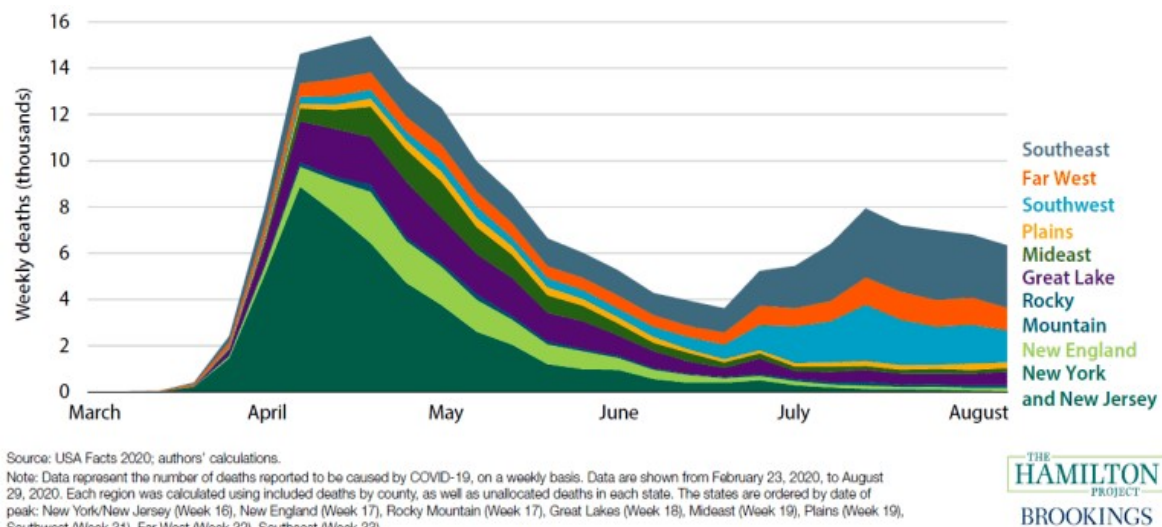
- (1) Small business revenue was down 20 % since January 2020
- (2) Only chapter 11 bankruptcies had increased relative to 2019
- (3) New business formations fell off in the spring but were on track to outpace recent years
- (4) Layoffs and shutdowns – and not reduced average hours – were driving in total hours worked
- (5) The number of labor force participation not at work quadrupled from January to April 2020
- (6) People not in the labor force who wanted a job spiked by 4.5 m in April and remained elevated
- (7) In April 2020 the U.S. personal savings rate reached its highest recorded level
- (8) Low-income families with children were most likely to experience an income shock
- (9) In 26 states, more than one in five households was behind on rent in July 2020
- (10) From 2018 to mid-2020, the rate of food insecurity doubled for households with children.

²⁷ Barlow, Jonathan and Irena Vodenska (2021) Socio-economic impact of the Covid-19 pandemic in the U.S. Entropy, vol. 23 (6), <https://doi.org/10.3390/e23060673>

²⁸ Tang, Vincent et al (2021) Gender Equality and COVID-19: Policies and institutions for mitigating the crisis. Washington D.C.: IMF, blog 'Fiscal Issues', July 28, 2021, <https://www.imf.org/en/Publications/SPROLLS/covid19-special-notes>

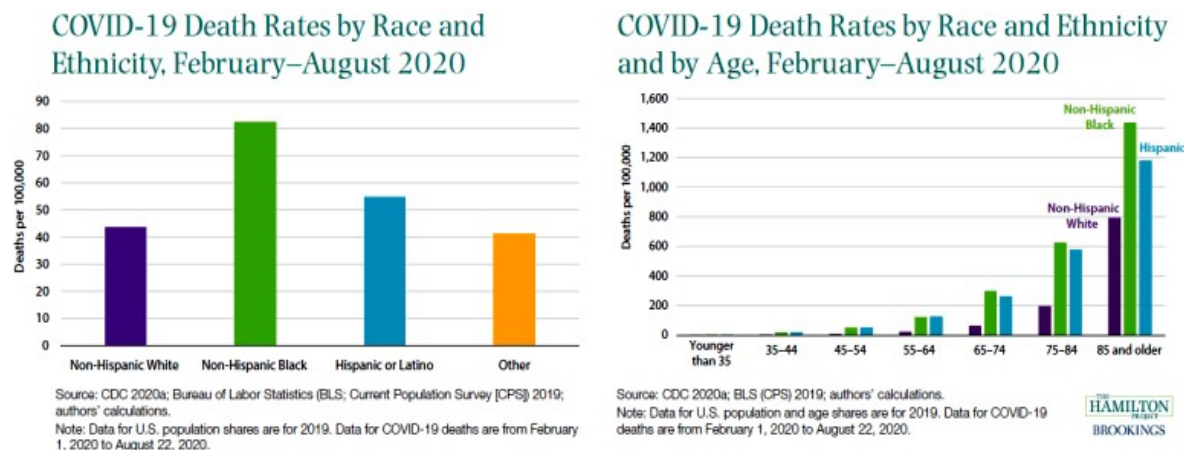
²⁹ Bauer, Lauren et al. (2020) Ten facts about COVID-19 and the U.S. economy. Brookings Institution, 17 September 2020

Figure 14. COVID-19 weekly death by US region, March to August 2020



Source: Bauer, *et al.* 2020

Figure 15. COVID-19 death rates by race, ethnicity and age, February to August 2020



Source: Bauer, *et al.* 2020

2. Impact of Brexit and Corona Crisis on the Transatlantic Partnership

2.1 The Impact of Brexit on the Transatlantic Partnership

Brexit will cause in the medium and long term a major negative shock, not just to the UK and EU. Also, the EU 27 might play a new role in the debate over, and practice of, the reform of world order after Brexit (Higgott R. (2021). Already for a long time, the EU had a growing interest and engagement not only in China but with North-East Asia as a whole, driven by the post-colonial commitments of the UK and France and the mainly commercial interests of Germany. Moreover, Washington exerts increasing pressure on the EU to take sides in its rising tensions with China. Therefore, also China's neighbours have been watching closely how London and Brussels respond to the US demand and how they manage their future relations with the region³⁰.

The political and economic fallout of Brexit will affect the rest of the OECD too, including the USA, although to a much lesser extent. Traditionally, Britain has been used as a gateway or steppingstone for American businesses intending to trade or invest in the EU. Brexit will force many US companies to pay double tariffs on goods exported to the UK and then re-exported to the EU³¹.

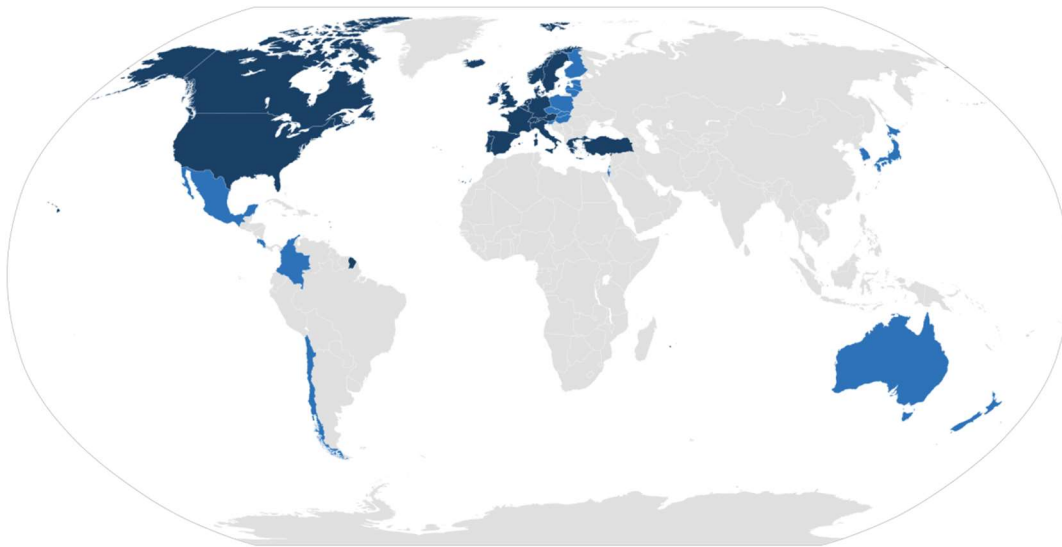
However, Brexit might reveal as a driver of populist nationalism and a Balkanization of post-Brexit Europe and beyond, including authoritarianism and illegitimate interference into the political electoral process.

³⁰ Higgott, R. (2021) The USA-East Asia and the Struggle to Reform World Order: What Role for Europe and the UK After Brexit? In: Reilly M., Lee CY. (eds.) A new beginning or more of the same? Palgrave Macmillan, Singapore. https://doi.org/10.1007/978-981-15-9841-8_2

³¹ GoCardless (2020) What Brexit means for the USA: A small business guide. GoCardless.com, 31 January 2020

Because of a possible domino effect, more and more voters, notably the deprived and those threatened by the loss of social and economic status accelerated by the predicted Brexit induced economic downturn, could develop a mounting distrust of the political establishment. Then they become easy prey for gamblers like Donald Trump or Marine Le Pen who offer them facts and fancy, thereby undermining the very conditions of social, economic and political stability, a vicious circle, difficult to stop³². If the EU, one of the world's largest trading blocs, is gradually disintegrating, this could have repercussions on trade deals worldwide and promote global uncertainty³³.

Figure 16. Organisation for Economic Co-operation and Development (OECD)
OECD member states [dark blue]; founding member states [light blue]



Source: [OECD](#), Wikipedia

Last, but not least, Brexit might trigger self-interested and closed off national policies not only in the UK but also e.g. in Eastern Europe. This could result, similar to Trump's approach to international affairs, in a radicalization of political partisanship, denying climate change, cancelling the membership in the Paris Climate Agreement, withdrawal from the WHO and negotiations about a nuclear deal with Iran³⁴.

Besides, Europeans cannot hope for a return to the transatlantic security partnership of yesterday. Washington's call for increased burden-sharing concerning NATO and more European strategic autonomy won't cease (James, 2020). However, this corresponds also to the conservative nationalistic European security policy which has been implemented already in the French-led European Intervention Initiative, the British-French Combined Joint Expeditionary Force and the UK Joint Expeditionary Force³⁵.

Finally, Brexit could affect the migration of Americans into the UK negatively. New immigration rules for non-UK nationals are likely to cause difficulties for any US companies with branches in the UK and the EU-27³⁶. Before Brexit, US immigrants had raised British GDP growth significantly³⁷. They had higher employment rates and also a better education than the average British employee. Also, they contributed to the public finances, despite relying on the British welfare system, with a net fiscal contribution of almost € 10,000 per household on average (2007-2009).

As for the stagnant TTIP negotiations, the Council of the European Union had granted the European Commission two negotiating mandates on April 15, 2019. Firstly, to (re) start negotiations with the USA on an agreement on the elimination of tariffs, on industrial products and an agreement on conformity assessment. Second, to sound areas of trade policy in which EU-US cooperation would be particularly effective, given joint

³² Foroohar, Rana (2016) Why Brexit really is a big deal for the U.S. Economy. Time.com, 27 June 2016

³³ Gillespie, Patrick (2016) How Brexit impacts the U.S. economy. CNN, Money Invest, 24 June 2016

³⁴ James, William (2020) Biden time for the transatlantic relationship? UK in a changing Europe, 26 Nov 2020

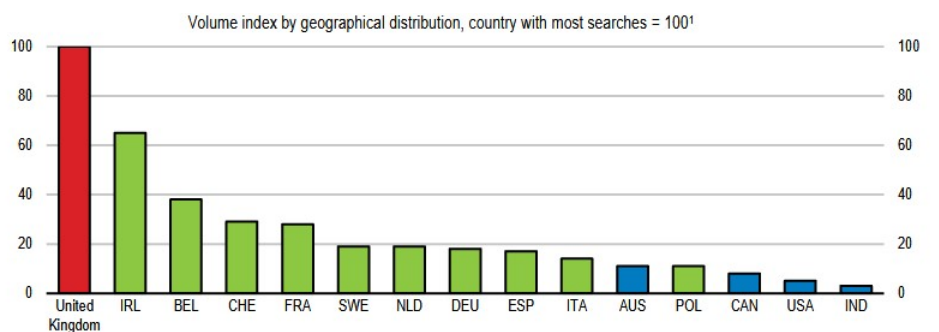
³⁵ James, William (2020): Biden time for the transatlantic relationship? UK in a changing Europe, 26 Nov 2020

³⁶ GoCardless (2020) What Brexit means for the USA: A small business guide. GoCardless.com, 31 January 2020

³⁷ Kierzenkowski, Rafal and Nigel Pain and Elena Rusticelli and Sanne Zwart (2016): The Economic consequences of Brexit: A taxing decision. OECD Economic Policy Papers

communications for a new transatlantic agenda presented after the last US elections by the EU-COM and the European External Action Service (EEAS) on 2 December 2020.

Figure 17. Brexit spillovers on USA trade ³⁸



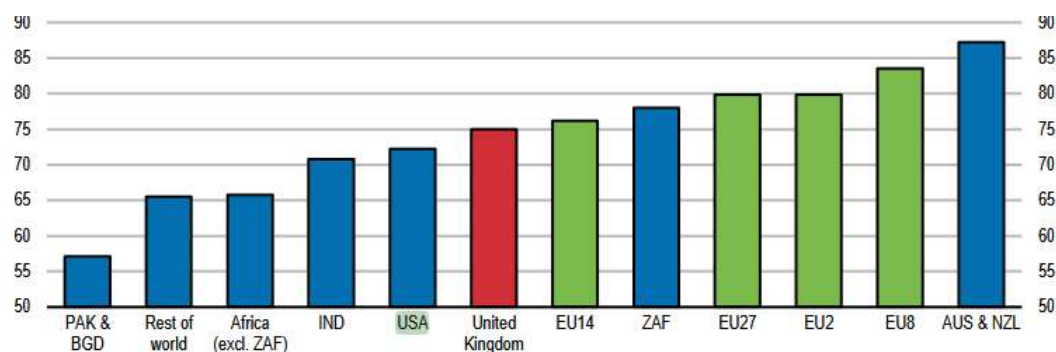
1. Adjusted for population size.

Source: Google Trends.

StatLink <http://dx.doi.org/10.1787/888933351033>

Source: Kierzenkowski *et al.* 2016

Figure 18. US immigrants employed in the UK
(% of population aged 16-64, 2015)



Source: Kierzenkowski *et al.* 2016

Figure 19. Potential Trans-Atlantic Trade and Investment Partnership (TTIP)
USA and EU-27



Source: [Ssolbergj](#), [TTIP](#) (Wikipedia)

³⁸ Related to Google searches for "Brexit" since October 2015

According to the president of the German Institute for Economic Research (DIW, Berlin), Marcel Fratzscher³⁹, a replacement for the failed TTIP agreement would strengthen Europe's position vis-à-vis China. In close consultations with Washington, Brussels should come to an agreement with the new US administration on how to deal with China. Therefore, the EU should rely on a new trade agreement with the USA in which the EU agrees on common standards that would then be globally binding. The best strategy for Europe would be to assert its interests in global system competition in a strong transatlantic partnership.

2.2 The Socio-Economic Impact of the COVID-19 Crisis on the Transatlantic Partnership

The COVID-19 pandemic has been characterized by European leaders as Europe's biggest challenge since the Second World War⁴⁰. Although it did not affect transatlantic relations directly, it added political divergences to already existing grievances and tensions, e.g. on the International Criminal Court, the Paris Climate Agreement, the nuclear deal with Iran and the relocation of the US embassy in Israel from Tel Aviv to Jerusalem⁴¹. The corona not only intensified nationalist and protectionist policies but fuelled also the geopolitical rivalry between the global players China and America⁴².

Trump's unlawful withdrawal from the WHO⁴³ on May 29, 2020, fortunately, revoked later on by Joe Biden, as well as his refusal to join an international vaccine effort of more than 170 nations, endangered not only the health and security of Americans but of the whole world, given the limitations of nationalist answers to the global spread of the pandemic. Instead, to overcome the pandemic, the US and EU should develop a transatlantic strategy to guarantee an early containment and alleviation of the crisis, notably because of a current fourth wave of the COVID-19 pandemic. Because the global spread of the virus is entangled inextricably with a response to other security challenges, like international migration and poverty alleviation, notably in Africa, this requires even stronger cooperation and a renewed sense of transatlantic solidarity between the two sides of the Atlantic⁴⁴. President Biden already pledged to enhance US-EU cooperation to defeat the pandemic and announced to contribute up to US\$ 4 bn for COVAX, a worldwide WHO-led initiative aimed at equitable access to COVID-19 vaccines also in developing countries⁴⁵.

Massive transshipping global problems, including the Transatlantic, seriously affected transatlantic retail trade. The pandemic lockdown suspended and reduced many economic activities and subsequently the volume of cargo being carried aboard container ships on the North American and European retail trade⁴⁶. Moreover, the already chaotic global container shipping market was hit since 12 August 2021, by the Corona induced suspension of container pick-up services at Zhoushan Port, the world's largest port in terms of cargo throughput. Also many major ports worldwide had been captured by the Delta variant virus and almost lost their ability to operate or risked trade abandonment like Chittagong, Bangladesh, responsible for more than 70 % of Bangladesh's cargo import and export. The same happened in other major South East Asian ports. Also, the US shipment was increasingly affected and the already extremely fragile global supply chain, e.g. in electronic chips, was burning hot.

The socio-economic impact of the pandemic on the EU and the US has been devastating. It had far-reaching political, social, and economic consequences beyond public health⁴⁷. Both partners need each other

³⁹ Fratzscher, Marcel (2021) Gescheitertes TTIP-Abkommen: DIW für neues Freihandelsabkommen mit USA (Interview, M. Fratzscher). Hamburg: DIE ZEIT (weekly), 23. Januar 2021

⁴⁰ Archick, K. and P. Belkin and S.E. Garding (2021) Europe, COVID-19, and US relations. *Current Politics and Economics of Europe*. Hauppauge, Bd. 32, issue 1, pp. 151-157

⁴¹ Arvanitopoulos, Constantine (2020) Transatlantic relations after the Covid-19 pandemic. *European View*, 6 December 2020, <https://doi.org/10.1177/1781685820975876>

⁴² Schmucker, Claudia (2020) The Effects of the COVID-19 Pandemic on US and European Commitment to the Multilateral Economic Order. Rome: Istituto Affari Internazionali (IAI)

⁴³ Gostin, Lawrence et al (2020) US withdrawal from WHO is unlawful and threatens global and US health and security. *The Lancet*, 9 July 2020

⁴⁴ Arvanitopoulos, Constantine (2020) Transatlantic relations after the Covid-19 pandemic. *European View*, 6 December 2020, <https://doi.org/10.1177/1781685820975876>

⁴⁵ Archick, K. and P. Belkin and S.E. Garding (2021) Europe, COVID-19, and US relations. *Current Politics and Economics of Europe*. Hauppauge, vol. 32, issue 1, pp. 151-157

⁴⁶ Valentine, Harry (2020) Multi-porting and container transshipment in the pandemic era. *The Maritime Executive*, 19 July 2020

⁴⁷ Archick, K. and P. Belkin and S.E. Garding (2021) Europe, COVID-19, and US relations. *Current Politics and Economics of Europe*. Hauppauge, vol. 32, issue 1, pp. 151-157

more than ever to cope with the covid crisis. Enhanced transatlantic cooperation to strengthen resilience would be required also in closely related areas of international relations, namely by an EU–US and UK–US trade agreement, a Visa Waiver Program, guarantees of Europe's energy security, 5G technology and a joint EU-US approach vis à vis China⁴⁸.

Conclusion

Economists and economic literature agree that Brexit is likely to harm the UK's economy, including a significant decrease in the UK's real per capita income in the medium and long run. In contrast, proponents of the withdrawal of the UK from the EU, like Premier Boris Johnson, promise a glorious future and a 'titanic success'. Whether Brexit will also bear on London's new policy 'Global Britain in a Competitive Age', including its former colonies, is open to question. London continued to follow its high flying ambitions, not just concerning the CANZUK union, meant to replace the lost EU-market access, but also vis à vis India and other big global players of the Commonwealth as well as the USA. However, the prospects of these ambitious projects are questionable.

A particularly sensible case is the combined impact of Brexit and the COVID-19 pandemic on the US and future transatlantic relations. From a global perspective, the problem is less the socio-economic impact on individual countries and relations concerned, e.g. the UK, EU, US and the Transatlantic, but the overall geopolitical repercussions of Brexit in times of the Corona crisis. The US, the UK and the Western alliance, in general, run the risk of losing their vested global political and economic influence hitherto focussed on the Transatlantic. Given the fierce competition between major global players like the US, UK, EU and China, Brexit reinforces already existing tendencies that redounds to the advantage of a shift of their traditional hegemony in the sphere of transatlantic relations to the Asian-Pacific realm of power. Brexit thus may trigger a domino effect of populist nationalism in the West that will weaken in the medium and long run its geopolitical power position.

In short, Brexit is likely to harm not only the British. The post-Brexit impact on the US and transatlantic relations will be negative too, but probably only be felt in the medium and long term as well. However, the direct and indirect negative effects of the global COVID-19 crisis will by far outdo the Brexit impact.

References

- [1] Akhtar, S. I. and Fefer, R. F. and Schwarzenberg, A. B. (2021). Brexit and outlook for a U.S.-UK Free Trade Agreement. In: Focus, Congressional Research Service (2021), updated 14 January 2021
- [2] Archick, K., Belkin P. and Garding, S.E. (2021). Europe, COVID-19, and US relations. *Current Politics and Economics of Europe*. Hauppauge, 32(1): 151-157.
- [3] Arvanitopoulos, C. (2020). Transatlantic relations after the Covid-19 pandemic. *European View*, 6. DOI:<https://doi.org/10.1177/1781685820975876>
- [4] Barlow, J. and Vodenska, I. (2021). Socio-economic impact of the Covid-19 pandemic in the U.S. *Entropy*, 23 (6): 673. DOI: <https://doi.org/10.3390/e23060673>
- [5] Bauer, L. *et al.* (2020). Ten facts about COVID-19 and the U.S. economy. Brookings Institution, 17 September 2020
- [6] Beverley-Smith, H. and Jefferies, C. (2020). Brexit: forging the New U.K.-U.S. relationship. Insights, Faegre Drinker Biddle & Reath LLP, 22 April 2020
- [7] Bevington, M. (2021) UK foreign policy beyond Brexit. Commentary, UK in a changing Europe. London, 28 January 2021. Available at: <https://ukandeu.ac.uk/uk-foreign-policy-beyond-brexit/>
- [8] Butler, S. (2021). *Cost of moving home rises as UK removals firms put up prices*. London: The Guardian (London), 1 Aug 2021
- [9] Carafano, J.J. *et al.* (2020). The US–European Economic Partnership Recovery Plan. Washington D.C.: Heritage Foundation, Special Report, No. 230, 8 May 2020.
- [10] Ellyatt, H. (2019). *What Brexit could mean for the US economy*. CNBC
- [11] Foroohar, R. (2016). *Why Brexit really is a big deal for the U.S. Economy*. Time.com, 27 June 2016

⁴⁸ Carafano, J.J. and L. Coffey and N. Gardiner and A.T. Miller and K. Kitchen (2020) The US–European Economic Partnership Recovery Plan. Washington D.C.: Heritage Foundation, Special Report, No. 230, 8 May 2020

- [12] Fratzscher, M. (2021). Gescheitertes TTIP-Abkommen: DIW für neues Freihandelsabkommen mit USA (Interview, M. Fratzscher). Hamburg: DIE ZEIT (weekly), 23. January 2021
- [13] Giles, C. (2021). *Covid pandemic masks Brexit impact on UK economy*. London. Financial Times, 1 July 2021
- [14] Gillespie, P. (2016). *How Brexit impacts the U.S. economy*. CNN, Money Invest, 24 June 2016
- [15] GoCardless (2020). What Brexit means for the USA: A small business guide. GoCardless.com, 31 January 2020
- [16] Gostin, L. *et al.* (2020) US withdrawal from WHO is unlawful and threatens global and US health and security. *The Lancet*, 9 July 2020
- [17] Hern, A. (2021). UK to overhaul privacy rules in post-Brexit departure from GDPR. *The Guardian* (London), 26 Aug 2021
- [18] Higgott, R. (2021). The USA-East Asia and the Struggle to Reform World Order: What Role for Europe and the UK After Brexit? In: Reilly M., Lee CY. (eds.) *A new beginning or more of the same?* Palgrave Macmillan, Singapore. DOI: https://doi.org/10.1007/978-981-15-9841-8_2
- [19] James, W. (2020). Biden time for the transatlantic relationship? UK in a changing Europe, 26 Nov 2020
- [20] Kierzenkowski, R., Pain, N., Rusticelli, E. and Zwart, S. (2016). The Economic consequences of Brexit: A taxing decision. *OECD Economic Policy Papers*.
- [21] Kohnert, D. (2021). Brexit and CANZUK: expectations versus realities. BLOG, UK-in-a-Changing-Europe, 8 July 2021
- [22] Linscott, M. (2020). The Trump administration's plan to upend the WTO. *Atlantic Council*, 18 June 2020
- [23] Mix, D. E. (2021). The United Kingdom: Background, Brexit, and relations with the United States. Congressional Research Service, Nr. RL33105, 16 April 2021
- [24] Plickert, P. (2021). Briten staunen über mögliches ‚Corona-Wunder‘. *Frankfurter Allgemeine Zeitung* (faz), 4 August 2021. English translation by Hall, Susan (2021): Corona in Great Britain: British are amazed at "Corona miracle". *Fuzzy Skunk*, 4 August 2021
- [25] Saunders, R. (2020). Brexit and Empire: 'Global Britain' and the Myth of Imperial Nostalgia. *The Journal of Imperial and Commonwealth History*, 48(6): 1140-1174.
- [26] Schmucker, C. (2020). *The Effects of the COVID-19 Pandemic on US and European Commitment to the Multilateral Economic Order*. Rome: Istituto Affari Internazionali (IAI)
- [27] Stacy, S. (2021). Can a Complicated "Consensus" survive a dose of populist poison? Exploring the potential impact of Brexit and Trumpism on the developed country approach to trade. *Law and Policy. Law and Development Review*, 14(2). DOI: <https://doi.org/10.1515/ldr-2021-0048>
- [28] Tang, V. *et al.* (2021). Gender Equality and COVID-19: Policies and institutions for mitigating the crisis. Washington D.C.: IMF, blog 'Fiscal Issues', July 28, 2021, Available at: <https://www.imf.org/en/Publications/SPROLLS/covid19-special-notes>
- [29] Valentine, H. (2020). Multi-porting and container transshipment in the pandemic era. *The Maritime Executive*, 19 July 2020
- [30] Wearden, G. (2021). *UK's lorry driver shortage 'could push food prices up', as supply chain crisis hits confidence – as it happened*. *The Guardian* (London), 26 Aug 2021

SOME EFFICIENCY ASPECTS OF MONOPOLISTIC COMPETITION: INNOVATION, VARIETY AND TRANSACTION COSTS

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Abstract:

We stress some efficiency aspects of monopolistic competition justifying it on account of its tendency to innovate and the questionable excess capacity paradigm. Some further efficiency aspects revealed are product variety and transaction cost savings. We view the monopolistically competitive firm as an essential source of technological innovation, product variety and cost economies. While perfect competition is universally considered a benchmark and a social optimum, we consider it a strongly unrealistic theoretical setup where the monopolistically, rather than the perfectly, competitive firm turns out to be the true type of competition and social optimum in the real world of positive transaction costs. The monopolistically competitive firm not only offers product variety and innovation but is the optimal institutional arrangement under positive transaction costs.

Keywords: efficiency; innovation; variety; monopolistic competition; perfect competition; transaction costs.

JEL Classification: D23; D24; D43; L13; O30.

Introduction

It is often considered that large corporations are the main source of innovation and scientific discoveries due to their size and ability to fund expensive research. Small competitive firms are rarely considered innovative due to their smallness and the fact that their low profits prevent them to invest in innovative projects. A sole proprietor has a vested interest in changing the technology, introducing some novelty, and eventually outstripping competition. The incentive structure of firms is thus ignored, and the focus instead is put on funding and investment opportunities.

This paper justifies monopolistic competition on account of the tendency to innovate revealing some further efficiency aspects such as product variety and transaction cost efficiencies. We view the monopolistically competitive firm as an essential source of technological innovation, product variety and cost economies. While the perfectly competitive firm remains an unrealistic type of market structure, the monopolistically competitive one turns out to be the true type of competition which gravitates most closely to the social optimum. The monopolistically competitive firm is not only strongly enticed to introduce product variety and innovation but is the optimal institutional arrangement under positive transaction costs.

Some economists doubt the efficiency of monopolistic competition. Many find it suboptimal due to its excessive advertising, high selling costs, unnecessary and excessive packaging. Some of these "sins" of monopolistic competition can be questioned. For instance, the advertising undertaken by the monopolistically competitive firm is modest due to the lack of budget opportunities and the few firms which advertise a highly differentiated product turn into an oligopoly in their sector. The fierce competition forces monopolistically

competitive firms to lower their production and marketing costs consistently. Cross transportation is another accusation but a product which consumers view as essentially different and useful must cross borders in order to satisfy their needs. Differentiated products move from one place to another following the simple economic principle that economic resources move to places where they are valued the most. Thus, what seems as unnecessary and excessive transportation may turn out to be a valuable feature of monopolistically competitive products. Some scholars go as far as criticizing monopolistic competition for the lack of product standardization and, hence, for providing too much variety.

The bias against monopolistic competition originates from the very founders of microeconomic science and industrial organization, Robinson (1933) and Chamberlin (1947). They argued that imperfect competition causes inefficiency in economic organization by giving rise to excess capacity. The very word “inefficiency” was attached to monopolistic competition since the inception of the term and has turned into one of its key attributes ever since. Monopolistic competition was condemned in part due to its small size which did not provide for large-scale production and, therefore, a standardized product. The cost-economizing effects and scale economies of market structures with market power were emphasized instead and monopoly and oligopoly were justified on the grounds of scale efficiency. Generally, there is a tendency in microeconomic theory to stress scale and the size of production much more than product use and value, consumer utility, product variety and transaction costs. The latter are ignored in neoclassical analysis where in the presence of low transaction costs monopolistically competitive firms provide for most intense competition.

This paper aims to study some welfare aspects of monopolistic competition stressing its sustainability and efficiency compared to other market structures. More specifically, it maintains that monopolistically competitive firms are more likely to adopt innovative methods of production, while providing greatest variety possible at the lowest production and transaction costs.

1. Literature Review

Robinson (1933) and Chamberlin (1947) introduced the term imperfect competition. In his discussion of the “small-group case” and the “large-group case” denoting monopolistic competition and oligopoly, respectively, Chamberlin seemed confused about the two. While trying to distinguish between them he consistently attributed oligopoly, that is, monopoly features to monopolistic competition. For instance, he saw market power as a consequence of product differentiation, as represented by a steep demand curve, but, at the same time, assumed free entry in the industry, as demonstrated by the tangency of the firm’s demand curve and its long-run average cost curve. Obviously, these two cannot co-exist and a firm with excessive market power is likely to face both a very steep and extended demand curve which creates a high profit-making potential. Competitive firms, on the other hand, are clearly subject to very flat and very low demand curves which bring the potential for excess capacity to a minimum. Monopolistic competition demonstrates that the assumption of free entry cancels the effect of product differentiation, and that product differentiation alone cannot provide market power to the individual firm. Barriers to entry, natural or artificial, are needed to ensure monopoly position for the individual firm.

Chamberlin also seemed to be confused about the advertising the “small-group” and the “large-group” undertake. He saw the monopolistically competitive firm as aggressively advertising whereas that is rather a feature of huge corporations in oligopolistic industries where excessive promotional and advertising wars result in devastating losses for both the firms and society. On the accusation of excess capacity Harrod (1952) has argued that the entrepreneur will choose optimal scale for a small competitive firm and not one which will leave too much idle capacity. In their model of monopolistic competition Dixit and Stiglitz (1977) found that, product diversity added, monopolistic competition is an optimal market structure, irrespective of the lack of scale economies. Demsetz (1982) has argued that product differentiation, patents, trademarks, and economies of scale create entry barriers because of the costs of information. Monopolistically competitive firms thus operate under low costs of information although products have differentiated features. Baumol (1964) maintains that if the number of firms in the industry is reduced, the variety of products available to consumers must fall. The resulting saving in resources is a net gain only if the total physical costs increase less than the increased choice for consumers. A very recent review of the concept of productive capacity is provided by Squires and Segerson (2020) who follow two general approaches to the analysis of capacity, an engineering one based on production possibilities and an economic one based on optimization.

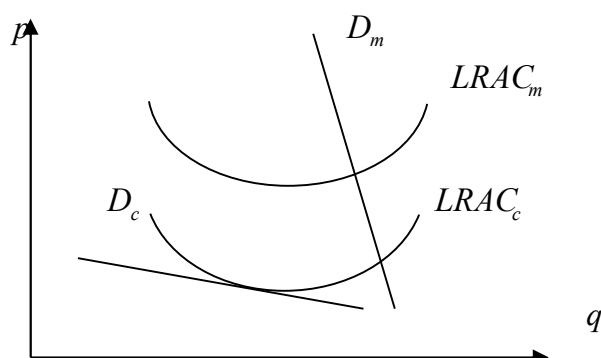
Arrow (1962) demonstrates that a competitive firm is more likely to innovate than a monopoly because it has more to win than the monopoly. The marginal benefit or revenue of innovation for the monopolist is insignificant while, if the same innovation is undertaken by a competitor, he will reap much of the industry profits

driving all other rival firms in the sector out of business. The competitor, therefore, has stronger incentives to innovate than a firm with market power.

2. The Efficiency of Monopolistic Competition

X-inefficiency and managerial slack are perhaps most illustrative of the advantages of monopolistic competition over other market structures. Due to their market power and lack of competitive threats, monopoly and oligopoly are subject to increased administrative and managerial costs which shift the average cost of the firm up to the level of $LRAC_m$, as in Figure 1. Competitive firms operate at low long-run average cost curves such as $LRAC_c$ and are, therefore, deprived of X-inefficiency. This type of inefficiency can take on various forms in monopolistic firms – rent-seeking activities, wasteful use of resources, poor organization and coordination of production, poor treatment and coordination of human resources, all kinds of managerial malpractice, managerial slack in the form of unnecessary managerial perks, rent extraction by managers at the expense of owners and all adverse effects on ownership resulting from the principal-agent problem.

Figure 1. Monopolistic competition versus the X-inefficiency of monopoly



Firms which fail to innovate and improve their production technology are also likely to face a higher $LRAC$ curve and, therefore, excess capacity. Except the efficiency of management, a given $LRAC$ curve reflects the level of technology used in the production process. A competitive entrepreneur would be enticed to consistently improve technology, lower average costs, and prevent entry. A monopolist has less incentive to lower his $LRAC$ curve and adopt a new, improved technology identical to what Figure 1 shows. Failure to innovate causes inefficiency in the form of excess capacity at the same level of demand for the firm's product. Monopolistically competitive firms improve their production technologies with the aim to prevent entry, respond to existing competition by incumbents or expand profit in an industry with a modest profit-making potential. Proprietors choose technologies and technical processes which are cost-efficient, cost-reducing or expanding the production set of the firm at the respective level of factor usage. Faced with a lower average cost curve the proprietor can beat competition on price, lower than that of the monopolist. A monopolistic competitor charges the lowest price and produces the greatest production volume at minimum inefficiency possible.

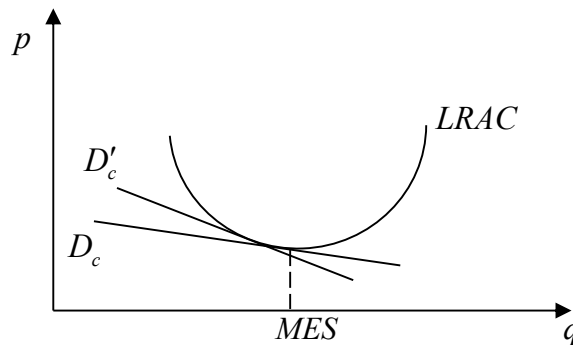
Monopoly and oligopoly are known for their indivisibilities when it comes to production factors. Indivisibilities do not allow scaling production up or down in response to changes in market demand. These technological peculiarities perhaps lie at the basis of market power since firms must operate at a large scale in order to handle indivisible factors of production. This also determines the existence of few firms in the industry. Except indivisibilities scale economies originate from sizable, fixed costs, setup costs, specialized inputs, volumetric returns to scale, etc. In addition to substantive fixed and setup costs, large firms are subject to significant administrative costs which represent a share of the fixed costs of the firm.

There are few or no indivisibilities of production in monopolistic competition. These are industries with a high scaling factor where all factors of production can easily be scaled up or down and fixed costs are almost non-existent in the short run. Setup costs of production are low which facilitates entry. Optimal scale of production is rather small with inputs being highly variable. Variable inputs prevail over fixed ones. The absence of sunk or setup costs characterizes these as contestable markets with both easy entry and exit. In contestable markets recoverable costs allow using inputs in alternative ways. Marketing, advertising, administrative and

managerial costs are minimal in monopolistically competitive firms. Machinery is general-purpose and inexpensive, while labor is unspecialized.

Monopolistic competitors, much more than monopolists, are driven by fashion and trends in changing preferences. The monopolistic competitor who relies on slightly changing product features to achieve product differentiation must consider styles, tastes, and customs which change dynamically. Monopolistic competition is the main driving factor behind fashion and style. At the same time, variety and production shifts require mostly a variable, rather than a fixed, component. Different colors, dyes, ingredients, components, or moulds necessary to produce different models, sizes, shapes, styles, flavors, textures, etc. relate to variable inputs. The share of fixed inputs in the form of unique equipment or other specific machinery is insignificant or machinery can be used in multiple production processes and operations. It could be expected that the cost structure of firms in competitive industries does not involve large indivisibilities and consists mostly of variable costs committed to variable inputs. These significant variable inputs and flexible technology lead to a relatively sharp long-run envelope curve, as opposed to the extended envelope curve in industries experiencing scale economies. Therefore, it may be wrong at all to discuss scale economies in the context of small firms, perfectly or imperfectly competitive. Stigler (1968) believes that large corporations are clumsy at providing variable, trendy products and small firms are more flexible in producing commodities such as women's apparel and shoes, novelty toys, etc.

Figure 2. Monopolistic competition under different degrees of product differentiation

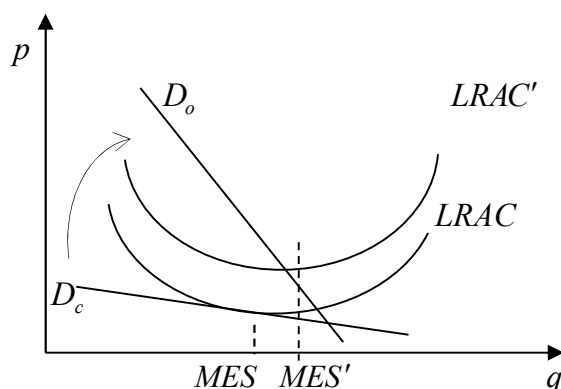


It seems, therefore, that variety originates from variable, rather than fixed, inputs and variety alone is a unique contribution of monopolistic competition at best and of oligopoly at worst. At the same time, monopoly and oligopoly which operate standardized equipment and run repetitive processes experience high learning curves of identical production. Unit costs of production drop with every successive bunch of items produced. A sole proprietor cannot achieve cost economies based on repetition in that production processes are non-standardized, unique, and subject to change. Production changes with every new color, trend, item, or model on style. The sole proprietor though gains learning experience in adapting to change, something the operational managers of big corporations cannot take pride in. While monopoly and oligopoly specialize in sameness and standardization, monopolistic competition specializes in variety.

Many essential products people consume today come from uniform, monopolistic-type production. But undoubtedly many socially important products originate from competitive industries as well. A diverse product is socially more important than a tedious, standardized one. The monopolistically competitive firm provides highly useful, valuable products with high marginal utility for society at relatively low cost and without the wasteful effect of excessive advertising. As part of the promotional mix of the large firm advertising serves as a barrier to entry by differentiating the product, as in Figure 2, and acts as fixed cost for the firm. This last outcome is often ignored when discussing advertising (Figure 3).

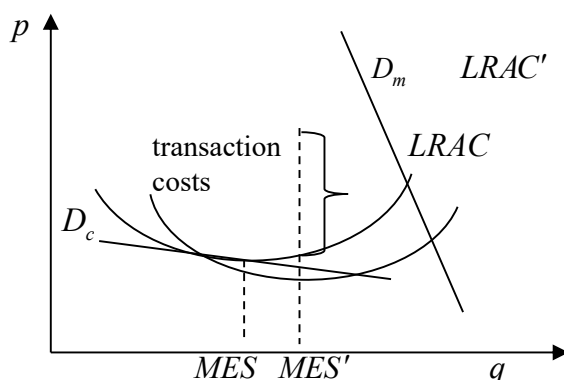
The effect of transaction costs on the total costs of the individual firm is identical to that of advertising. Transaction costs, defined as the costs of market operation or rather market substitution by firm management (Coase 1937), act as fixed costs which increase the optimal production scale similarly to advertising. Both advertising and additional transactions add a cost component to the firm structure and thus shift the total cost curve up (Figure 4).

Figure 3. Monopolistic competition versus oligopoly



Note however that in both cases since a fixed cost is added to total cost the minimum efficient scale, that is, the optimal scale of operations is increased – since large firms supplant high transaction costs and operate in industries with significant risks of market operation, they are likely faced with a substantive increase in the optimal scale of operation, much beyond the point of social optimum under zero or negligible transaction costs.

Figure 4. Optimal scale of operations under different market structures



Transaction costs are never zero in the real world. Coase (1937), Williamson (1979), Eggertsson (1990) and others have long stressed that transaction costs do exist and affect the behavior of economic agents. Williamson (1989) has gone as far as claiming that different types and levels of transaction costs bring about different types of institutional arrangements, firms, and market organization. Coase (1937) has maintained that lower levels of transaction costs pair with smaller firms, while larger firms supersede the market mechanism in cases when the transaction costs of its operation are substantive. The manager undertakes to do more and more transactions and perform the functions of the market as he saves on the costs of using market organization alternatively. What is the role of monopolistic competition in this?

Competitive markets are those where transaction costs are positive, yet negligible. The degree of competitiveness is illustrative of the ease with which information can be obtained. It is believed that in perfectly competitive markets participants both on the demand and the supply side obtain information at zero cost and are thus fully informed. Information about prices, quality levels, number and type of buyers and sellers, etc. is abundant and the level of certainty is infinite. In this ideal world of perfect certainty and information it is hard for anyone to take advantage of another. Quality cannot be misrepresented, and no form of cheating can occur. It seems that the social optimum, as implied by the perfectly competitive model, is one of honesty and fairness. However, in reality no such perfect world can exist where economic agents are perfectly honest. This renders the perfectly competitive framework unrealistic. In real terms information is never perfectly abundant and accessible (often it is even scarce) and economic agents are sometimes susceptible to all forms of market opportunism.

We can, therefore, conclude that perfect competition is an unrealistic assumption on account of three premises, 1) that products can hardly be perfectly homogeneous in reality; 2) that the market power of the individual firm is hardly ever zero; and 3) that transaction costs are always positive in the real world.

Industries which operate under low transaction costs are usually strongly competitive, without being perfectly so, entry and exit are easy, there is little opportunism on the part of market participants, information flow is free, and uncertainty is low. High-transaction cost sectors are those where significant barriers to either entry or exit exist, competition is low, if none, information is scarce, and uncertainty is infinite.

Monopolistically competitive markets tend to be markets where information can be obtained at low cost and transactions take less to organize. Since information is easy to get, the potential for opportunism is minimal. Search takes less time and is usually easier. Transactions take less to organize compared to other forms of market structure. Monopolistically competitive markets thus are real-life markets where transaction costs are positive, yet minimal. They present themselves with strong competition, easy entry and exit, little opportunism, accessible and abundant information, and nearly complete certainty. Under positive transaction costs, monopolistic competition is the true form of competition, while perfect becomes an ideal, hypothetical, and unrealistic benchmark. Monopolistic competition illustrates best the inconsistency and abstractness of perfect competition as a form of economic organization and a resource allocation system. Monopolistic competition stresses best the impossibility of perfect competition in real life.

At the same time, other market structures which present themselves with high market power gravitate around the second type of market organization where competition is absent, there is great potential for uncertainty and contractual opportunism on the part of the firm with market power, information is costly to obtain and there are natural or artificial barriers to entry. Market power turns into an essential source of opportunism since it is difficult for numerous customers to handle an opportunistic monopolist or, alternatively, difficult for numerous suppliers to handle an opportunistic monopsonist. A result of market failure, monopoly power originates in transaction costs, with transaction costs being low in monopolistically competitive markets and high in monopoly and oligopoly. Monopolistic competition, therefore, is the true type of competition in the real world, a situation which provides for optimal allocation of economic resources, since it reflects the social optimum at positive, yet minimal, transaction costs.

Conclusion

Based on innovation, variety, and transaction costs as sources of inefficiency, monopolistic competition has advantages over market structures with market power. Compared to monopoly and oligopoly monopolistic competition is more likely to adopt innovative techniques of production, provide wide variety of goods and save on transaction costs. Although deprived of repetition, a sole proprietor easily specializes and experiences a high learning curve in providing variety. In the real terms of positive transaction costs, monopolistic competition comes out as the true type of competition, compared to the unrealistic perfectly competitive setup.

References

- [1] Arrow, K. J. 1962. Economic Welfare and the Allocation of Resources for Invention in *The Rate and Direction of Economic Activities: Economic and Social Factors*, Richard Nelson, ed., Princeton University Press, pp. 609-626, ISBN: 0-87014-304-2.
- [2] Baumol, W.J. 1964. Monopolistic Competition and Welfare Economics. *The American Economic Review*, 54(3), Papers and Proceedings of the Seventy-sixth Annual Meeting of the American Economic Association, (May, 1964), pp. 44-52. Available at: <http://www.jstor.org/stable/1818488>
- [3] Chamberlin, E.H. 1947. *The Theory of Monopolistic Competition*, Cambridge: Harvard University Press, 5th ed.
- [4] Coase, R.H. 1937. The Nature of the Firm. *Economica*, New Series, 4: 386-405. DOI:<http://doi.org/10.2307/2626876>
- [5] Demsetz, H. 1982. Barriers to Entry. *The American Economic Review*, 72: 47-57, DOI:<http://www.jstor.org/stable/1808574>
- [6] Dixit, A.K and Stiglitz, J.E. 1977. Monopolistic Competition and Optimal Product Diversity. *The American Economic Review*, 67(3): 297-308. DOI: <http://www.jstor.org/stable/1831401>
- [7] Eggertsson, T. 1990. *Economic Behavior and Institutions: Principles of Neoinstitutional Economics* (Cambridge Surveys of Economic Literature). Cambridge: Cambridge University Press, DOI:<https://doi.org/10.1017/CBO9780511609404>
- [8] Harrod, R.F. 1952. Theory of Imperfect Competition Revised. *Economic Essays*, ISBN: 978-1-349-01496-5.

- [9] Robinson, J.V. 1933. *The Economics of Imperfect Competition*. London: Macmillan, 2nd edition, 1969, ISBN: 978-0-333-10289-3.
- [10] Squires D. and Segerson K. (2020) Capacity and Capacity Utilization in Production Economics. In: Ray S., Chambers R., Kumbhakar S. (eds) *Handbook of Production Economics*. Springer, Singapore. DOI:https://doi.org/10.1007/978-981-10-3450-3_7-1
- [11] Stigler, G.J. 1968. *The Theory of Price*, New York: Macmillan, 3rd edition, ISBN: 978-0024174000.
- [12] Williamson, O.E. 1979. Transaction-cost Economics: the Governance of Contractual relations. *Journal of Law and Economics*, 22: 233–261. DOI: <https://doi.org/10.1086/466942>
- [13] Williamson, O.E. 1989. Book Review for 'The Firm, the Market and the Law'. *California Law Review*, 77: 223-231. DOI: <https://doi.org/10.2307/3480533>



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DEMOGRAPHIC POLICY CONSTRUCTION: INAPT USE OF GROWTH RATES ILLUSTRATED

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Abstract

The use of ratios, rates, and percentages is prone to manipulation in demographic policy formulation. That the political and economic benefits get distributed pro rata among various communities, fuels the temptation. Democracies are ruled by the majority community; the temptation thus leads to policies adverse to minorities on false reasoning in self-interest. This brief paper illustrates such a misuse of growth rates in a community coined for the purpose.

Keywords: demography; population growth; base values.

JEL Classification: J10; J11.

Introduction

Demography is a recent and upcoming area in economics with focus on population dynamics. Our very entry in this word and exit from it form part of population statistics. Change in population is continual, not only through births and deaths but also via the two-way migrations. Population dynamics brings about political and cultural transformation that often gives raise to long-run majority–minority conflict within and across nations. The church is divided between the Catholics and the Protestants, the followers of Islamic faith even more – the Shia-Sunni divide is well-known. Even the Jews have clans. Hindus have a rigid caste hierarchy; capital versus labor is an ideological divide with shades. The conflict between the races – white and black – in South Africa took centuries to finish. In the US it still continues. In Hong Kong the Chinese and the locals do not see eye to eye. Bangladesh separated from Pakistan essentially for economic reasons. Chinese made the Great Wall centuries back to keep the Mongols out. Today the Americans are doing the same thing to shun Mexicans. Pakistan fortifying its western border, fearing Afghan influx. Examples can be multiplied.

1. The Illustration

The causes of these actions are usually complex. They are rooted in sociology, economics and politics, and vary over time and space. Our object here is not to indulge in a discussion on them. It is very limited. We aim at demonstrating how the use of population growth rates can lead to fallacious policies that hold little water. We erect a fictitious community of Whites and Blacks for this demonstration albeit the data we present below in Table 1 is of a real case.

Table1. Population in million

1951		2101	
White	Black	white	Black
30.01	3.621	319.8775	72.2895
P_{0w}	P_{0b}	P_{nw}	P_{nb}

The place is ruled by the White (W), The Black (B) being in minority. The Whites contend that their rate of growth is slower than the Black who would eventually exceed them in number to capture governance. The apprehension has led the Whites initiate policies backed by legislation to block the proclivity. We propose to investigate as follows.

- 1.Are Blacks indeed growing at a faster rate than the Whites, and
- 2.If yes, are they likely to overtake the White; when? We know that

$$P_n = P_0 (1+r)^n \quad (1)$$

If other values in the equation are known, we can follow r as follows.

$$P_n = P_0 (1 + r)^n$$

$$(1 + r)^n = \frac{P_n}{P_0}$$

Raises both sides to the power of (1/n):

$$[(1 + r)^n]^{\frac{1}{n}} = \left[\frac{P_n}{P_0} \right]^{\frac{1}{n}}$$

$$1 + r = \left[\frac{P_n}{P_0} \right]^{\frac{1}{n}}$$

$$r = \left[\frac{P_n}{P_0} \right]^{\frac{1}{n}} - 1$$

Then, finding r is straight forward.

2.The Projection

Using the procedure and using the data at two time-points - 1951 and 2021 - in Table 1, we find r for W and B approximately as W = 4.8466% and B = 6.171%. Thus, the contention that Blacks are growing at a faster rate than the Whites is true and the difference looks substantial.

But would that growth rate difference make Blacks eventually overtake the Whites relegating them to the second position in the land as feared? For investigation, we work a fifty years population projection onwards from 2021 using equation (2) in each case.

$$P_{2050} = P_{2021} (1 + r)^{50} \quad (2)$$

Based on Excel spread, we present relevant data at a 10 year interval in Table 2,

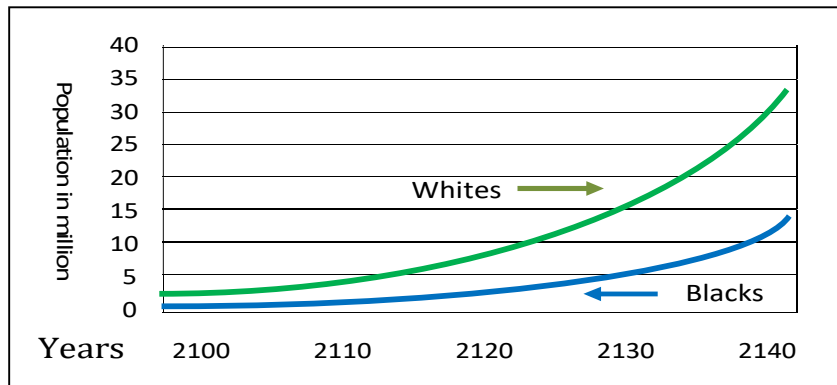
Table 2 Growing excess of Whites over Blacks for the next 50 years

Community	2101	2110	2120	2130	2140	2150
Whites W	320	490	787	1284	2029	3258
Blacks B	72	123	225	409	744	1353
W - B	248	367	562	875	1285	1905

The following Figure based on full data amply clarifies and helps nullify the apprehension of the Whites. Instead of narrowing down, the inter-community number gap would continue widening ad infinitum in their favor despite the faster growth of the Blacks⁴⁹

⁴⁹ In 1951, I had purchased an old book: Tippetts- Statistics. It was a small sized hard cover. Statistics contained no statistics, just a few illustrative figures. It explained the basics of the subject including sampling with amazing clarity. The lengthiest chapter was – Expressing it in numbers. It explained the pitfall in the use of averages, ratios and percentages. The memory of that reading inspired me to write this paper.

Figure 1. Growth projection of Whites and Blacks: 2100-2150



The population analysis of this paper is relevant to understand the counter claims of social groups as parties relating to distribution of things like land or incomes between the Jews and Muslims in Palestine on the return to home of the Arabs who had left or were expelled from the land after the 1967 Yume Kafor War when Israel captured the West Bank, the Gaza strip and the Golan Heights. It nullifies apprehensions in the OS of the whites that the faster growth of the blacks may reduce their share in the national political and economic pie. For the same sort of peril American are constructing a border wall to arrest migration from Mexico. It allays fears of Hindus that the Muslims would eventually overtake them because of their faster growth rate. Indeed, some states have already passed laws to arrest the alleged trend. The catch in most such arguments is the neglect of the initial numbers – the base of growth calculations. Such unfounded fears at times give rise to mistrust and divisive policies.

Concluding Remarks

This paper exposes how population statistics can be as it is used at times to the disadvantage of the minority communities to benefit the ruling majority. Minorities suffer in several ways:

- They do not get a fair share in political power that constitutions grant them.
- They receive less than their dues from public welfare scheme like health, education and shelter.
- Their proportion in employment declines
- Their number in poverty groups swells.

References

- [1] Indian Census Reports and surveys.
- [2] Tippets H, H. C. L. 1946. Statistics (Home) UK
- [3] United Nations Statistics Division (December 2014): Overview of Demographic Concepts and Methods.
- [4] Wattenberg, B. J. 2004. *How the New Demography of Depopulation Will Shape Our Future*. Chicago.

BEHAVIOURAL ANALYSIS OF STAKEHOLDERS TOWARDS SOCIO-ECONOMIC CHANGE: THE ENERGY TRANSITION JOURNEY IN THE AREA OF GELA

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Abstract:

This work is divided into three parts. Part One describes the reference literature and in particular the Rogers curve, which is helpful to understand the stage of adoption of innovations in which the population of the Gela area is. According to this theory, the process of acquisition of new technologies follows a customary pattern that may be useful to describe in detail the current attitude of the population towards the conversion in place and to assess or change the implementation of any interventions. Part Two involves the preparation and distribution of a questionnaire of 20 closed-answer questions to investigate: personal data, lifestyle to protect the environment, daily habits on recycling, waste and sustainable mobility, interests in circular economy and potential inclination of the area for its economic development. Part Three concerns the analysis of the answers to the questionnaire, in the light of the Rogers curve, to understand whether or not the data confirm the existence of innovators, in order to understand the impact on the success of the conversion in place and suggest possible correction strategies.

Keywords: circular economy; energy; history; innovators; sustainability; transition; Rogers curve.

JEL Classification: N54; O35; P18; P28.

Introduction

The history of energy has always been very dynamic in its evolution. The expression 'energy transition' is not new; in fact, starting from the 18th century, the transition from wood to coal, and later to oil, gas and nuclear power are all examples of energy transitions. These transitions have been driven by innovation and technological progress. They have been slow but unstoppable, and their impact on society, the economy and global geopolitical balances has been profound. The world today is witnessing a new energy transition to renewables, which is proving to be faster and more disruptive than previous ones. Once again, this transition is changing the energy sector. The conventional energy paradigm, based on the production of energy from fossil

fuels, is no longer sustainable: not only for environmental reasons, but also for economic reasons. The accelerated economic development of the twentieth century and the demographic growth of the world population, which has increased from 3 to 7 billion people in just one hundred years, have pushed on the consumption of fossil energy resources, causing two problems:

- Depletion of energy resources. Depletable energy resources are present in absolute quantities. Every unit consumed is equivalent to one less unit available. The regeneration times for oil, coal and natural gas are geological and go far beyond the human vision of time.
- Pollution. The combustion of fossil energy resources first caused local pollution. With the development and growth of production, pollution has taken on an international and global scale. The capacity of the environment to absorb pollution is now insufficient. In other words, pollution changes the environment in which man himself lives.

The shift from the use of non-renewable to renewable energy sources is part of the wider transition to sustainable economies through the use of renewable energy, energy saving techniques and sustainable development (Ferrajolo 2015). It may consist in the replacement of production plants, or their conversion or repowering, and is currently a crucial issue for Gela, a city where the construction of a huge industrial plant in 1963 (Magini 1976, 187-188), larger than the city of Gela itself, at the time of construction, represented a great upheaval and impact of a landscape, economic and socio-cultural nature for the local reality. Until the early sixties, in fact, Gela was a purely agricultural reality partially devoted to sheep farming and fishing activities, which due to the petrochemical plant has abruptly changed its economy and today in the midst of a general socio-economic crisis finds itself having to change its inclination as much radically.

An important step for the revitalization of the area was the Memorandum of Understanding for the Gela area signed on 6 November 2014 by: Ministero dello Sviluppo Economico, Regione Siciliana, Comune di Gela, and Eni S.p.A, Eni Mediterranea Idrocarburi S.p.A., Raffineria di Gela S.p.A., Versalis S.p.A., Syndial S.p.A., and Filctem CGIL, Femca, CISL, Uiltec UIL, UGL Chimici, CGIL, CISL, UIL, UGL Territoriali and Confindustria Centro Sicilia.

Pursuant to Article 2 of the Memorandum of Understanding for the area of Gela, identify and acknowledge the following main objectives:

- 1) to develop new activities based on innovative environmental technologies, enhancing the industrial strengths present in the territory of Gela and focusing on the manufacturing approach of the area and on the professionalism of the resources present in the site;
- 2) to launch new hydrocarbon exploration and production activities in the Sicilian Region and in the off-shore area next to it, as well as to develop and exploit the potential of fields already in operation, both offshore and onshore;
- 3) to ensure employment in line with the restructuring process of the industrial area of Gela and also to encourage the development of additional local businesses operating in the energy sector, green chemistry or diversified sectors in accordance with the objectives of the Memorandum.

In 2014, Eni declared its intention to build a biorefinery in Gela by 2019, which is estimated to have a throughput of approximately 750,000 tonnes/year and a production of 530,000 tonnes/year of green diesel. The project consists in converting the traditional refining scheme of the Gela industrial site with the use of crude hydrocarbon oil into a biocycle, capable of producing high-quality biofuels through the application of Eni's proprietary technological solutions and 'Ecofining' technology. Gela biorefinery will process loads consisting mainly of palm oil (530,000 tonnes/year) and will produce green diesel, green naphtha, green LPG and potentially green jet fuel for a total of approximately 630,000 tonnes/year. Intervening on existing plants, in addition to allowing a significant reduction in investment costs compared to the construction of a new biorefinery, allows the redevelopment of an industrial site and positive effects on the territory through work and local socio-economic development. When fully operational, the biorefinery plant will use not only crude palm oil but also second-generation loads such as animal fats and waste cooking oils, and will significantly reduce the impact on the environment compared to the traditional cycle.

In the light of the objectives present in the Memorandum, the question has been raised as to how incisive the *human factor* can be with regard to the possibility of developing the various environmental technologies. In particular, the behaviour of consumers and the social acceptance of changes taking place in the Gela area. Technology can accelerate change, but people are the real key players: involvement, at all levels, and motivation are crucial today to obtain real benefits. In helping to create the conditions for the area as a productive organism as a whole to reproduce and continue to produce, it is important to activate relationships that are not only aimed at guaranteeing economic development factors. In particular, the link with human capital

is significant: a company that aims to activate qualified workers must be able to guarantee a high quality of life for the local communities where they will reside. In the light of these considerations, it was necessary to investigate the perception of the inhabitants of the area regarding green innovation, through the distribution of customized questionnaires.

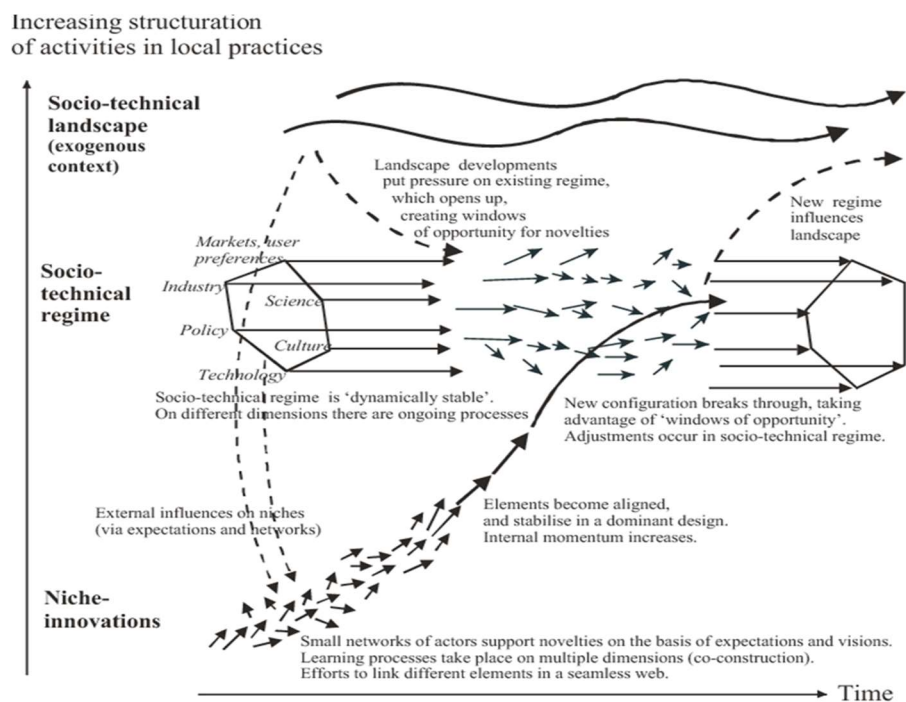
1. The Research

The analysis starts from the essential concept of transition. From the point of view of integrated systems, we define the concept of transition as a change in a system from one dynamic equilibrium to another (Stanley 1971). The underlying mechanism is co-evolution, as different subsystems co-evolve with each other, leading to irreversible patterns of change. Therefore, a transition is the result of developments in different domains. In other words, a transition can be described as a set of related changes that strengthen each other, but take place in several areas, such as technology, economics, institutions, behaviour, culture, ecology, belief systems and can be seen as a strengthening spiral. Since transitions have a multi-dimensional nature, with different dynamic levels, it will be natural for a significant number of developments to occur in different fields. To use a mechanical metaphor, all social phenomena act as an impulse for transitions, but only a few are able to provide a driving force (Rotmans *et al.* 2001). Thus, a transition can be accelerated by events that occur just once, such as a war or a major disaster, such as Chernobyl, or a crisis, such as

the oil crisis, but it can not be caused by such events. The process that causes the trigger is the co-evolution of a set of slow changes that determine the tendency substantial change (Bowles *et al.* 2003).

The relationship between socio-technical innovation in a sustainable key and local contexts is a particularly significant research topic for social sciences, especially in recent years. Several scholars have proposed interpretative and analytical frameworks, aimed at understanding the ways of sustainable innovation, trying to design a model of ecological transition able to connect national and supranational regulatory schemes with social practices located in local contexts (Markard *et al.* 2012). In this field, one of the most well-known theoretical contrasts is certainly the one that sees on the one hand the so-called Multi-Level Perspective (MLP) and on the other the theory of sustainable innovation practices. In the first case, authors such as Geels and Schot (2007) propose a model of dynamic and holistic regulation, within which ecological innovation originates in specific socio-technical niches. Starting from locally and temporally circumscribed experiences, the transition is transferred to increasingly wider levels of formalization (and social legitimacy), first in regimes (meso level), then in real socio-technical scenarios (macro level), as represented in Figure 1.

Figure 1. Schematic explanation of the multi-level perspective (MLP) of transition theory framework



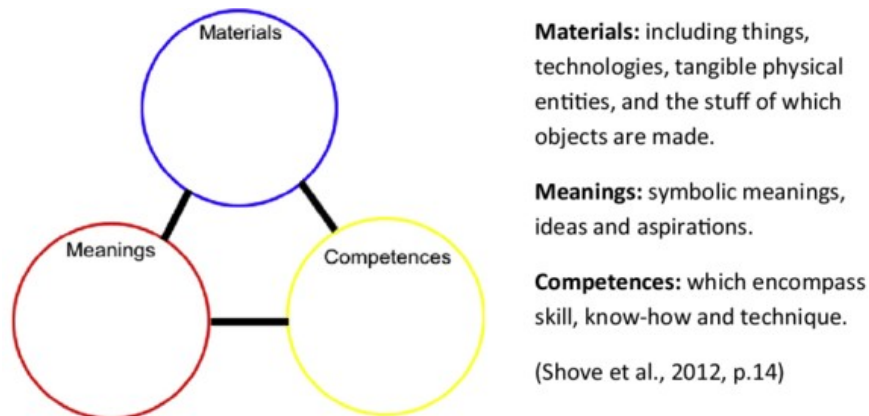
Source: Geels and Shott (2007).

In this scheme (Figure 1) the transition is understood as a process of non-linear interaction of three socio-technical levels: the 'niches', *i.e.* limited and protected places where radical innovations are created and developed; the 'regimes', *i.e.* the areas of social practices and rules and institutions that bind actions in existing systems; the 'landscape', *i.e.* the general background in which macro-processes are located. According to this scheme, innovations develop in niches, but have the chance to spread in regimes - which tend to self-serve themselves - when changes in the landscape are such as to destabilize them from the outside. In this sense, the alignment between niches, regimes and landscape allows radical innovations to produce technological leaps that can promote important social changes by changing socio-technical regimes.

In contrast, for scholars of sustainability practices (Shove 2012), ecological transition is produced by changes that are defined within configurations that connect the symbolic-cultural dimension (meanings), know-how (competences) and technologies (materials), as shown in Figure 2.

In short, albeit in different ways, both approaches give the local dimension a significant importance, despite a very intense debate on the very possibility of achieving a modelling of these dynamics.

Figure 2. Schematic explanation of social practices theory, Shove 2012



Having clarified the mechanism of a transition, it is easy to understand that the spread of renewables and efficiency, the engine of energy transition, cannot take off if they do not take into account culture, communities and individuals (Walker *et al.* 2010). The transformation of the prevailing model of energy production from fossil sources to renewables and the climate issues related to it and to the sustainability of the current development model, have so far been addressed only by adopting the categories of economic sciences and engineering. The focus of the research has been on hardware rather than software, *i.e.* human and social aspects. The history of human development is a history of transitions from one energy production system to another that has produced major social changes (think of the impact of coal and oil on society in the 19th and 20th century) (Spaargaren 2011).

However, the current energy transition requires us to consider, on the contrary, the impact of the human factor on the possibility of developing different environmental technologies. According to some research approaches analyzed (Magnani 2018), renewable energy is conceived as a great social experiment that requires multi-level changes. The policies to support renewables in Europe in the 2000s were mainly based on the introduction of incentive rates as a solution to help fight what was believed to be the only problem and obstacle to the acceptance of renewables. Every country in the world has on its agenda the commitment to increase the contribution of renewable sources in their energy needs. Some countries have set themselves ambitious targets and have created an environment for the development of new technologies and for renewable technologies that is very fertile from a technical and economic point of view. However, as the penetration of plants for the production of energy from renewable sources increases, it can be observed that the diffusion is not as efficient and fast as expected: there is one factor that has so far been largely neglected and that frequently appears to be an obstacle to the development of projects: social acceptance. This aspect was neglected in the 1970s and 1980s, during which time programmes for the creation of energy policies started. Opinion polls showed that the population widely accepted renewable energy technologies so politicians, developers, companies and local authorities did not consider the issue of social acceptance. The first problems arose when it was necessary to decide where to install the first wind turbines: the problem of choosing the site often turned out to be a problem that involved a large number of actors with sometimes diametrically opposed interests (Corrias, Felici 2019). Despite this, until the 1990s the question of social acceptance was never

studied in depth. Among the first consequences found the most important socially is what was called the 'NIMBY Effect', the expression (Not In My Back Yard) coined in 1980 by W. Rodger, of the American Nuclear Society and linked to the British politician N. Ridley (1929-1993), Secretary of State of the Conservative Party for the Environment. The acronym NIMBY - Not In My Back Yard - refers to the protest by members of a local community against works of public interest on their territory (e.g. major roads, quarries, settlements or industrial developments, waste-to-energy plants, landfill sites, stores of hazardous substances, power plants and the like), who would not oppose their construction in another place nevertheless (De Luca 2012). But most of the sociological studies that have analyzed the conflicts surrounding renewable energy plants in industrialized countries criticize this simplistic label.

The *NIMBY* syndrome implies a vision that is characterized by attitudes of selfishness, i.e. focus only on one's own special, local interests, irrationality and excess of emotionality, lack of balance and weighting in risk assessment, superficiality and ignorance. However, through empirical research, both qualitative and quantitative, several studies have highlighted the substantial groundlessness of these accusations up to the point of speaking of a true myth. In the last 30 years in the OECD countries was rooted the belief that technological improvement alone would be enough to control energy consumption and mitigate the problem of global warming. Decades of policies based on this hypothesis have not led to the expected energy savings. The reason for this failure was initially sought by analysing the weaknesses of efficiency policies and by looking for market barriers.

Technological improvements, the development of new equipment and the continuous increase in process efficiency alone are not sufficient to reduce energy consumption and pollutant gas emissions. Very efficient equipment can be used in a completely inefficient way, thus frustrating the energy savings that can be achieved. The purchase of systems and equipment with low energy consumption is important, but in order to achieve a society with sustainable energy consumption it is also necessary to focus attention on aspects concerning lifestyle, habits, values, behaviour, procedures and standards. A sustainable energy model can be achieved by acting in two directions (Disconti 2011):

- by producing energy from renewable sources (wind turbines, photovoltaic panels, etc.);
- by saving energy (greater efficiency of processes and systems, lifestyles with lower energy intensity, etc.).

Both directions are encountering non-technical-economic obstacles that slow down their development. Renewable technologies feature some substantial differences compared to traditional plants:

- smaller size. They are essentially smaller plants and consequently there is a need for more sites for their installation, so that more people are actively involved;
- lower energy density. They have a lower 'energy density', i.e. the visual impact per MWh of output is much greater than traditional plants, which very often use underground mines or environments already put to the test by previous uses;
- undefined externalities. External costs (externalities) are not yet taken into account when assessing the cost of energy produced by traditional plants, renewable technologies cannot compete on a 'neutral field'.

Instead, the importance of other explanatory variables was underlined (Spaargaren 2011): the question of the conflict between expert knowledge and knowledge based on experience and the history of places; questions of distributive environmental justice concerning the cost-benefit distribution between social groups and territories, but also the procedural one such as the presence in spatial planning of a transparent and participatory decision-making process able to provide information for all relevant stakeholders and the possibility to express their different opinions. This often prevents the local community from participating in or benefiting from projects dealing with renewables. Sociological studies state that there is a need to overcome the usual approaches to places of transition: both the one that considers places of renewable energy production essentially as backyards, courtyards dominated by NIMBY oppositions, and the one that considers renewable energy projects as 'sites to be developed', which is the perspective chosen by experts and that focuses on the search for technical characteristics of potential places, such as the average wind speed, proximity to the power grid, soil characteristics, accessibility, visual impact, etc. (Patrucco 2018).

Technical, economic and ecological aspects are important, but the locations for renewable energy projects are not only sites with topographical, ecological or archaeological characteristics. They are also territories interwoven with symbolic or emotional elements, memories, stories and myths, and also with relationships and provisions of share capital, which make them more or less fragile and mediate the way in which the same technology can be implemented. Empirical research shows that public opposition occurs more frequently in social contexts where attachment to and identification with the place are altered. There is currently

no single definition of 'social acceptance' of a technology. One of the broadest and most agreed definitions is the one proposed by Wüstenhagen (*et al.* 2007). In this definition social acceptance is divided into three distinct dimensions: socio-political acceptance, community acceptance and market acceptance, represented in Figure 3.

Figure 3. The triangle of social acceptance of renewable energy innovation



Source: Wüstenhagen *et al.* 2007

Socio-political acceptance

The *socio-political dimension* of social acceptance is understood at a more general and extended level. It concerns the population and organisations.

In general, opinion polls show a high acceptance of technologies and policies for the diffusion of renewable technologies. For this reason, policy makers have never considered the social acceptance of these technologies problematic, but moving towards a local level, where the citizen sees his own interests and space undermined, the problem exists and opposition movements can arise that can block the development of the project.

Community acceptance

This dimension of social acceptance refers to the acceptance of the choice of sites for the installation of the plants by the local community or citizens living in the immediate vicinity of the project and local institutions (in this dimension of social acceptance the NIMBY phenomenon, about which we have already talked, is expressed).

A study focused on the acceptance of wind power plants (Wolsink 2007) shows that community acceptance follows a U-shaped curve. People give good support in the initial phase when they express their support 'in a general way'. Acceptance falls sharply when they are confronted with a project proposal in their neighbourhood or area of residence and then rises to a good level of acceptance after the construction of the plant.

Another very important factor is the perception of a 'cost-benefit distribution'; it must be as fair, just and clear as possible.

Market acceptance

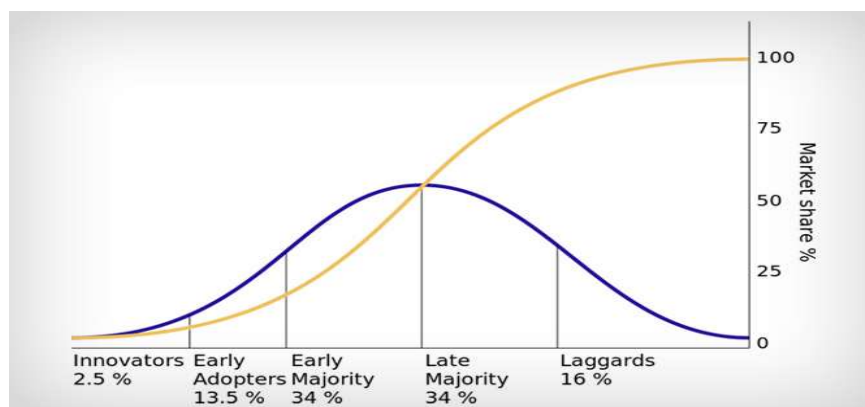
Social acceptance for renewable energy plants and new technologies can be interpreted as market acceptance, i.e. as the process of 'adoption and implementation' of an innovation by the market. According to this perspective it is possible to analyse social acceptance using the analyses present in the literature on the processes of introduction, development and diffusion of an innovation. This is possible in part because, unlike most innovative consumer products, renewable technologies are strongly linked to infrastructure, the area and are of a certain size. The strategies that can be identified in the literature apply to small plants, such as domestic power generation plants.

A perspective focused on the territory rather than on the productive potential of a site does not aim to ensure the acceptance of a technology by the population, but to identify the ways in which the technology can be adjusted to the place (Shove, Warde 2002); that is, the extent to which residents believe that the proposed project does not alter the specificity of a place and allows continuity with the past. Adjustment also concerns the relationships between local and non-local actors that renewables produce and the extent to which local social actors are able to incorporate technological innovation into the relational structure. Energy consumption and saving has always been a crucial issue in the relationship between energy and society (Urry 2000).

The science of energy saving was initially exclusively technical and economic, focused on increasing the technological efficiency of energy production, transmission and consumption. However, at some point, social sciences began to take an interest in the issue of the variability of energy consumption, and to try to understand why people do not adopt the most energy-efficient behaviour, even when this is technically possible. The point is that when people use goods and services they do not consider their activities to be about energy consumption, but rather they think they are doing normal activities such as cooking, travelling, cleaning. Consumption, in fact, is within the practices and cannot be seen. People are not interested in consuming energy in itself, but they are interested in the services it makes possible. In this perspective, the change and evolution of energy consumption is strongly dependent on the ability of new technologies to be effectively integrated into everyday life practices (Schumacher 1973). Innovation is at the heart of economic change, it is the gateway to change, however, without diffusion there is no change: an inseparable pair. It is a complex phenomenon with multiple aspects (technological, social, economic, political), but above all it is a dynamic phenomenon, characterized by long-term changes with profound effects on the evolution of the economy. It is seen by businesses as a means of increasing profits and market share; by governments as a means of improving the country's economy, and by individuals as an improvement in their living conditions. The diffusion of a new technology, of a new consumption model, is a dynamic process that often features a spatial model characteristic over time. Without diffusion an innovation would have a limited socio-economic impact. Diffusion, in the context of innovation, is the process by which the individual or company adopts a new technology without predecessors (within a company or an economy), or replaces an old technology with a new one. The most important determinant of the benefits arising from the adoption of a new technology is the degree of improvement that it provides on the previous technology and how easily these benefits can be identified by the adopter. Thus, one explanation for the possible slow adoption of a technology is that the relative advantage of new technologies is often rather limited at the time of their first introduction. Uncertainty in purchasing is often due to the fact that the benefits are normally diluted over time while the costs need to be dealt with immediately, making it necessary to estimate the life cycle of the technology. Uncertainty slows down the adoption rate (Lissoni 2000).

Understanding the dynamics of 'diffusion' is therefore fundamental to this research to give a complete reading of the status quo but, above all, to draw conclusions and recommend possible solutions. The author who has contributed most to the development of studies on the diffusion of innovation is Rogers (2003). According to this theory, the process of acquiring new technologies follows a usual pattern described in this graph:

Figure 4. Rogers adoption/innovation curve



The innovation adoption curve of Rogers (2003) is a model that classifies those who adopt innovations into different categories based on the idea that some individuals are inevitably more open to innovation than others. The concept of categories is important because it shows that all innovations must go through a natural, predictable, and sometimes long process before they become widely adopted within a population.

The categories Rogers identifies are:

- innovators (2.5%);
- early adopters (13.5%);
- early majority (34%);
- late majority (34%);

- laggards (16%).

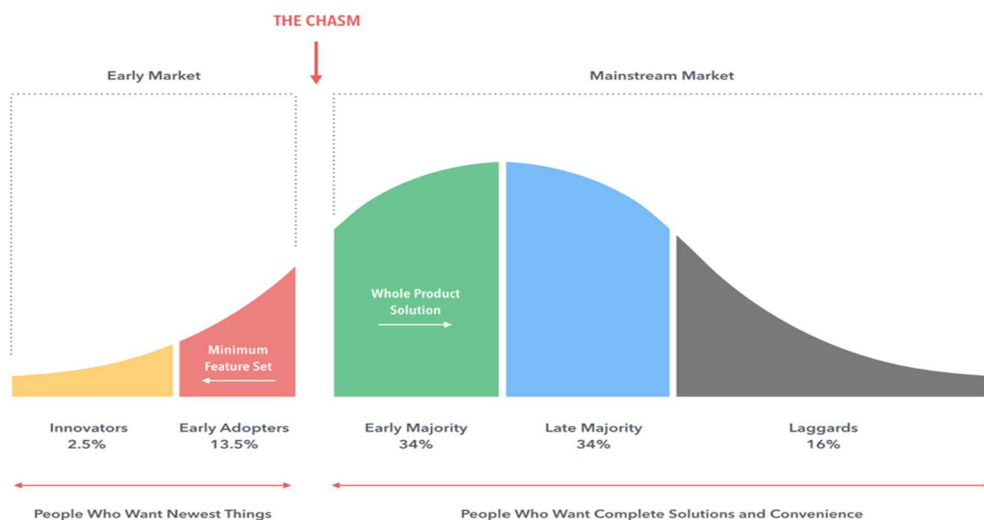
The identified categories of adopters are important because:

- a person's propensity to adopt an innovation affects the rate of absorption of the innovation over time;
- different groups have different propensities to invest in innovation and do so for different reasons and with different expectations;
- people who belong to the categories of innovators and early adopters are easier to convince to adopt new solutions;
- (both early and late) majority, which account for 68% of a population, is the one that determines the success or the failure of innovation;
- the majority have different needs from early adopters in terms of support, different emphasis on technology and teaching;
- innovators may require more flexibility and less control, whereas the majority may require more stability and support;
- innovators and early adopters only account for a small percentage of the population (2.5% and about 13%) and are not enough to have an impact on the success of innovation within an organization.

Early and late majority (called *mainstream adopters*) account for 68% of a population and represent the part of the population that can make a difference in the success of innovation within an organization. The former are usually more practical: they analyse the pros and cons of a new solution before adopting it, and help make it more tangible and acceptable. But if the support and infrastructure do not prove suitable, they are ready to change their mind. The latter, on the other hand, have fixed habits and are predictable. They want to know the rules, they love systems. The point to make is that when they don't find the rules, they start to get them themselves. Laggards tend to behave in the same way, and only adopt an innovation when it has become a standard current practice. Basically, the success of innovations goes first through a period of slow adoption, then experiences a sudden period of rapid adoption and then a gradual levelling (typical S-shaped curve). The rapid expansion of most successful innovations occurs when social and technical factors allow and feed them (Stone 1999).

Rogers's Diffusion of Innovation Theory was further refined several years later by Geoffrey A. Moore (1991). He points out that there is a sort of 'chasm' (Figure 4) between innovators/early adopters and the masses of consumers: conquering the former is therefore fundamental, because they are those who are able to evangelize the masses and thus spread the new products/services presented on the market like a virus.

Figure 5. Conceptual graph of crossing the chasm



The existence of a 'chasm' between 'early users' and 'early majority' creates difficulties, since it is very difficult for new technologies to move from the early innovators/users market to the mainstream one. This chasm derives from the deep differences existing between the two categories: the 'visionaries' think and spend big with the aim of being the first to have new products; whereas the 'pragmatists' are cautious and want to stay within reasonable boundaries of expectations and budgets proceeding slowly and cautiously in the innovation process (Mascia, Mills 2018).

The chasm is generated when the early user market is saturated and the mainstream market is not yet ready to buy (Moore 2013). So, there is no one to sell to (Loudon, Bitta 1979). The unawareness of the existence of the chasm, or its inadequate consideration, can create crises; therefore, it is necessary to make the time between the saturation of one market and the opening of the other as short as possible, with specific marketing strategies for the different categories. The aim is to minimise time in the chasm precisely because the more time one spends in this state, the more one risks failure.

Social factors can weaken the incentive mechanisms designed only for rational actors who are supposed to act on the basis of a pure cost-benefit calculation. Non-economic barriers, in fact, slow down the spread of renewable sources and of actions, behaviours and choices based on sustainability (Wejnert 2002).

We need to understand what prevents us from investing our money in a renewable energy system or in the thermal efficiency of our homes, rather than in a flat screen TV or in a super-equipped car. Our lives are made up of daily choices and despite the fact that we are increasingly talking about sustainability, climate change, alternate number plate days, eco-passes, fine dust, biodegradable bags, GMOs, etc., there still seem to be a lot of resistance to a real paradigm shift. It is not simply a question of providing the right information and motivation. Consumers should not be considered as isolated and rational individuals, but rather as people with habits and customs (CBC Radio 2010) regarding what is 'normal to do' or what is 'comfort', and be included in wider routine connections, consolidated knowledge and technological paths.

Energy systems, and the possibilities for their change, are not only economic or technological, but also involve social life patterns, representations, organizational models and relational structures. In order to generate the social preconditions for the transition to a low-emission society, focused on a growing production of energy from renewable sources and on greater sustainability of consumption, it is therefore urgent to reaffirm the centrality of a sociological approach to energy.

The introduction to the literature has shown us that energy systems, and the possibilities for their change, are not only economic or technological, but also involve social life patterns, representations, organizational models and relational structures. The qualitative survey will be used to investigate, following the Rogers curve that describes the impact on the success of innovation and adaptation to change, consumer behaviour and social acceptance of the changes taking place in the Gela area with particular reference to the transformation of the petrochemical site into a biorefinery. The most important determinants of the benefits arising from the adoption of a new technology are the degree of improvement that it provides on the previous technology and how easily these benefits can be identified by the adopter. Thus, one explanation for the possible slow adoption of a technology is that the relative advantage of new technologies is often rather limited at the time of their first introduction. Uncertainty in purchasing is often due to the fact that the benefits are normally diluted over time, while the costs need to be dealt with immediately, making it necessary to estimate the life cycle of the technology. Uncertainty slows down the adoption rate, so understanding where on the curve the population of Gela is in the acceptance and behaviour of energy conversion is a good starting point to decipher any problems (Laino 2016).

2. Specific Objective

The research aims to test green behaviours implemented by a sample of the population of Gela in support for the actions of redevelopment of the territory, sustainability, circular economy and innovation that ENI has been trying to achieve in Gela since the signing of the Memorandum of Understanding in November 2014. The data will be organized in such a way as to allow the control of the hypotheses.

The objective is to obtain, with reference to the answers to the questionnaire and the Rogers curve, some data confirming or not the existence of innovators to understand the impact on the success of the conversion in place and to suggest possible correction strategies.

Specifically, the work wants to test the following hypotheses:

H1: The lifestyle of the population advocates circular economy.

H2: The population has begun to implement change by investing in *Green Economy* funding both at the entrepreneurial level and in cultural education.

H3: The population trusts in the transformation of the Company for the economic development of the City.

3. Methodology

A multiple-choice questionnaire will be used as a research tool, in order to avoid dispersion in issues not strictly related to the subject of the survey.

The questionnaire consists of 20 questions divided into three areas:

- 1) Group 1-6 will collect personal and employment data;
- 2) Group 7-15 will collect information on consumer behaviour;
- 3) Group 16-20 will investigate the acceptance of ongoing changes.

The data collected, from the questionnaires distributed by e-mail or handed directly, will be processed through spreadsheets. The analysis of the data will be carried out in two phases, in the first phase the total data of the entire sample will be analyzed, while in the second phase the data will be analyzed by single category to understand if differences between the different categories emerge and if it is already possible to identify a cluster of innovators.

The sample consists of 100 people on a population of 70,000 inhabitants and involves distribution to:

- 58 Citizens
- 15 Businesses
- 8 Trade Associations
- 6 Professional Associations and Boards
- 1 Environmental Associations
- 5 Representatives of Political Institutions
- 5 Educational Institutions
- 2 Cultural Territorial Attractors

The sampling method followed the criterion of 'reasoned choice', in order to be able to represent all the main categories that have an impact on change and to understand their 'insight' (a term used in psychology and marketing), *i.e.* the 'inner vision' that defines consumers' expectations, the weaknesses, the deep motivations that push them to act and also their subdivision into types of users, because just as there is not one single type of person there is not one single type of customer and behaviour either. On the basis of the data collected, the insights allow us, in fact, to get a snapshot of the 'feeling' of the area regarding the socio-economic changes taking place in order to structure a successful strategy for future action (Laughlin 2015).

Specifically, we have chosen to represent all the categories that live and act in and for the area:

- Citizens, because of their natural active role as key players in the evaluation processes;
- Companies as the hub of social and economic relations;
- Trade associations as representatives protecting the interests of different social and professional partners of the population;
- Professional associations for their dual role of guaranteeing the quality of service to citizens and protecting the professions of the association to which they belong;
- Environmental associations as promoters of environmental protection (the central theme of the change taking place);
- Local political representatives because they are on the front line in managing public affairs;
- Head teachers because they are decision makers in the education of adolescents who are decisive in the process of cultural renewal;
- Cultural attractors, associations that work for growth and social cohesion and take on the role of 'accelerator of innovative processes' on a territorial/district scale.

These categories have been identified and chosen numerically on the basis of their proportional presence in the area and because they collaborate directly or indirectly for the same purpose: the common good.

4. Methodology Description of the Sample

The above sample was thus divided by Sex, Age and Citizenship.

A higher percentage of men corresponding to 56% is shown in *Table 1*, the lowest age of the sample is represented by 2 18-year-old subjects while the highest age is represented by two 72-year-old subjects, the most representative sample is made up of 6 45-year-old subjects as can be seen in *Chart 6* followed by 43-year-old and 56-year-old with representation of 5 subjects by age. The citizenship of the subjects, represented in *Chart 7*, is totally Italian and therefore 100%.

Table 1. Description of the sample by Sex

Female	43
Male	56
Other	1
Tot.	100

Chart 6. Description of the sample by Age

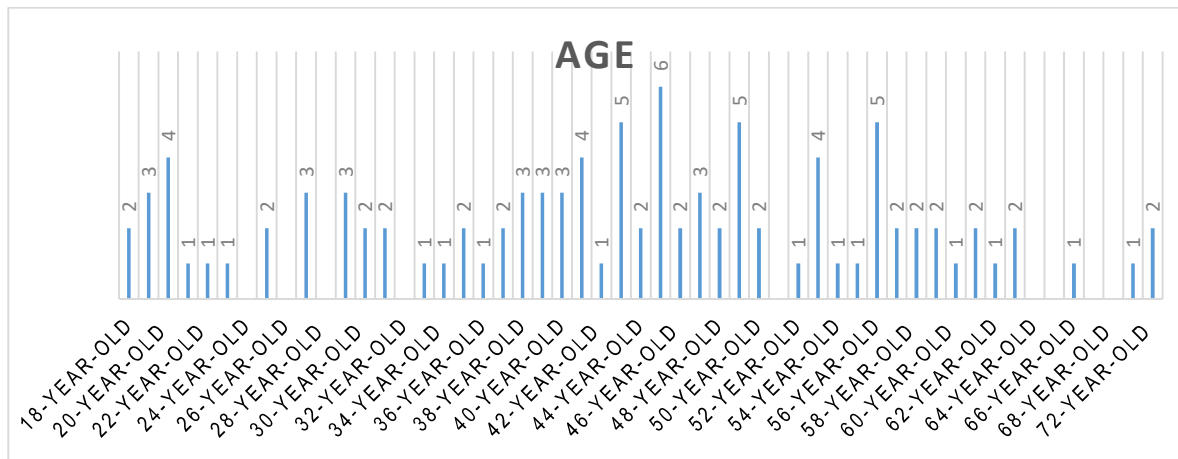
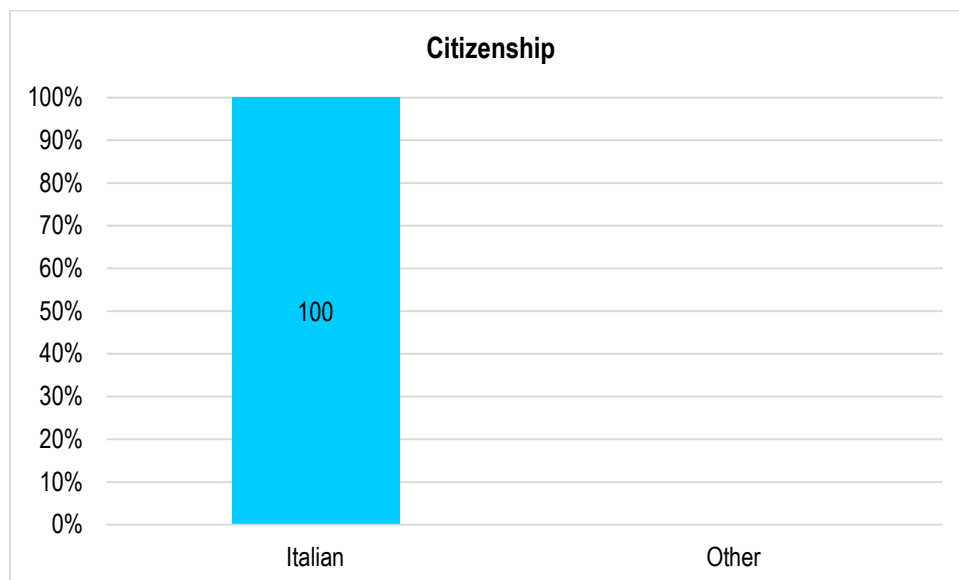


Chart 7. Description of the sample by Citizenship



The place of residence, level of education and employment is instead presented with a higher percentage of the sample 38% living in a residential area *Table 2*, with a very high percentage of graduates as much as 51% *Table 3* and *Chart 8*, and no one without education, that is 0%. With regard to employment shown in *Chart 9*, the highest percentage is represented by freelancers, who represent 27% followed by unemployed 17%, followed by students and workers.

Table 2. Description of Residence

Centre	30
Outskirts	30
Residential area	38
No answer	2
Tot.	100

Chart 8. Description of Education

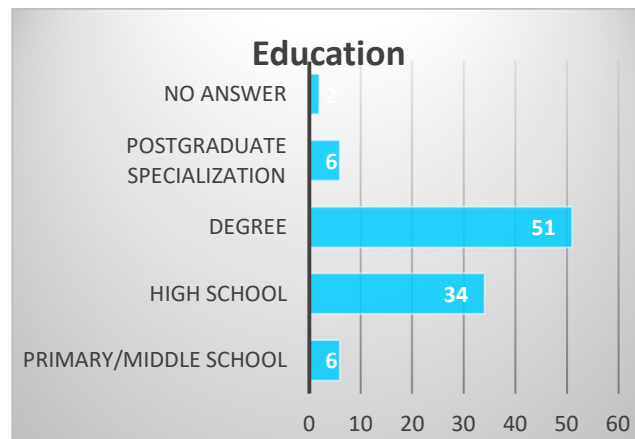
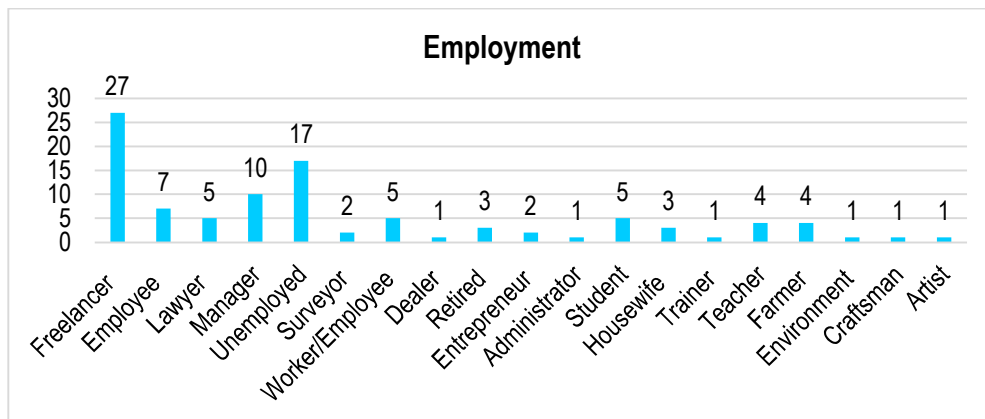


Table 3. Description of Education

None	0
Primary/Middle school	6
High school	35
Degree	51
Postgraduate specialization	6
No answer	2
Tot.	100

Chart. 9 Description of Employment



5. Results

In order to assess hypothesis H1 and to verify whether the population advocates a lifestyle in support of the circular economy, we will analyse the data collected in the questionnaire questions that correspond to questions 7, 8, 9, 10 and 11.

Chart 10. Answers to question 7 'Do you lead a sustainable lifestyle that protects the environment ?

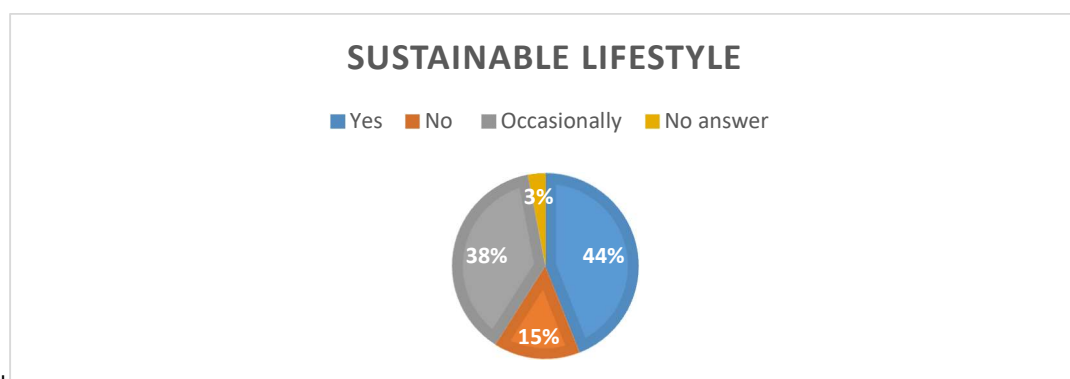
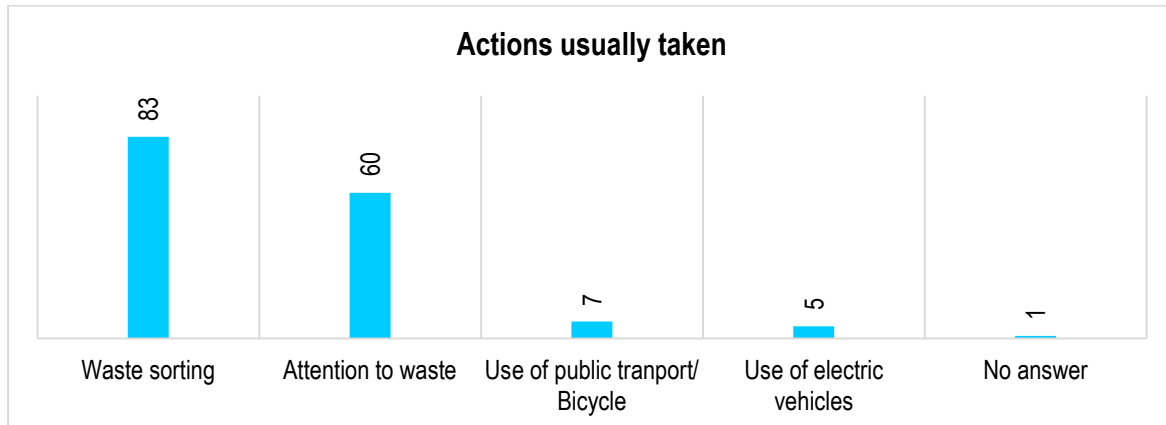


Chart 10 shows us that the majority of subjects, i.e. 44%, claim to lead a sustainable lifestyle that respects the environment, followed by subjects who claim to do so occasionally, and finally only 15% who claim not to lead a sustainable lifestyle at all.

Chart 11 illustrates the actions related to the above statements, which interviewees specifically take in carrying out a sustainable lifestyle. It can be seen that the action taken by 83% of the subjects is to sort waste, followed by the action of paying attention to waste, while only 5% use electrical vehicles.

Chart 11. Answer to question 8 'Which of the following actions do you usually take?' (Multiple answers are possible)



Graph 12 shows, on the other hand, that most of the subjects in the sample have the habit of recycling objects, and this represents as much as 80% of the sample.

Chart 12. Answer to question 9 'Have you ever recycled anything?' (e.g. plastic or glass bottles, shopping bags, old cartons, textiles, etc.)

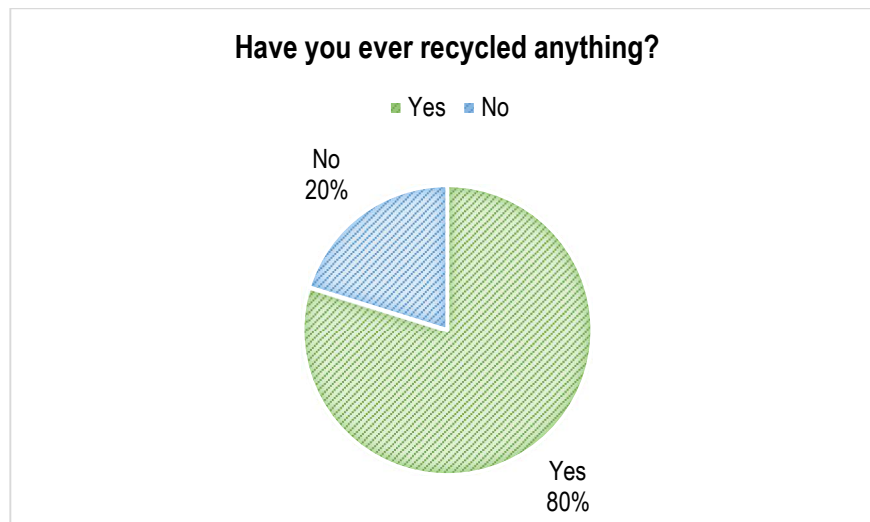


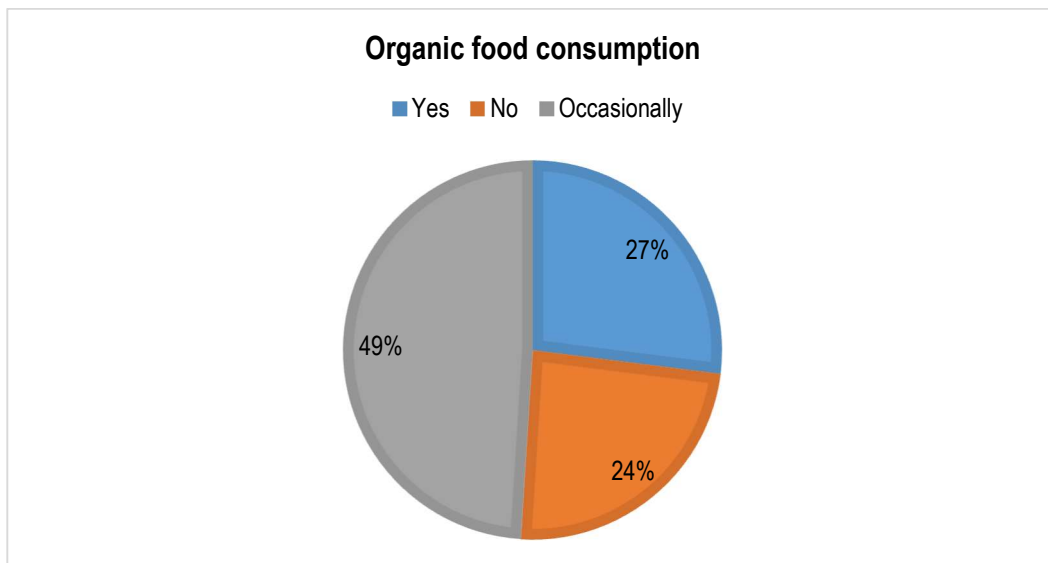
Table 4 shows the supporters of the circular economy, who represent the majority of the sample, but 29% say they do not know how to express themselves on the subject.

Table 4. Answer to question 10 'Are you a supporter of the circular economy?'

Yes	57
No	13
I don't know	29
No answer	1
Tot.	100

Chart 13. It shows that the highest percentage is made up of people who sporadically consume organic food, 49% answer 'Occasionally', leaving a very small gap between those who consume it and those who do not, representing 27% and 24% respectively.

Chart 13. Answer to question 11 'Do you consume organic food?'



Questions 12 and 13, reported in charts 9 and 10, illustrate the attitude of the population in terms of cultural change, the answers to these questions will try to verify hypothesis H2 indicating if the population under analysis has begun to implement a change, by keeping informed and investing in green economy funding, both at the entrepreneurial and cultural level by participating in initiatives and meetings on eco-sustainability.

Chart 14 shows that only 28% of the sample participated in cultural initiatives in support of eco-sustainability, while the vast majority, i.e. 71%, did not.

Chart 15. It confirms the trend in Graph 14, showing that the majority of the population surveyed, i.e. 63%, did not move in the direction of green investments, an action carried out by 36% of the subjects.

Chart 14. Answer to question 12 'Have you participated in cultural initiatives/meetings on eco-sustainability in the last year?'

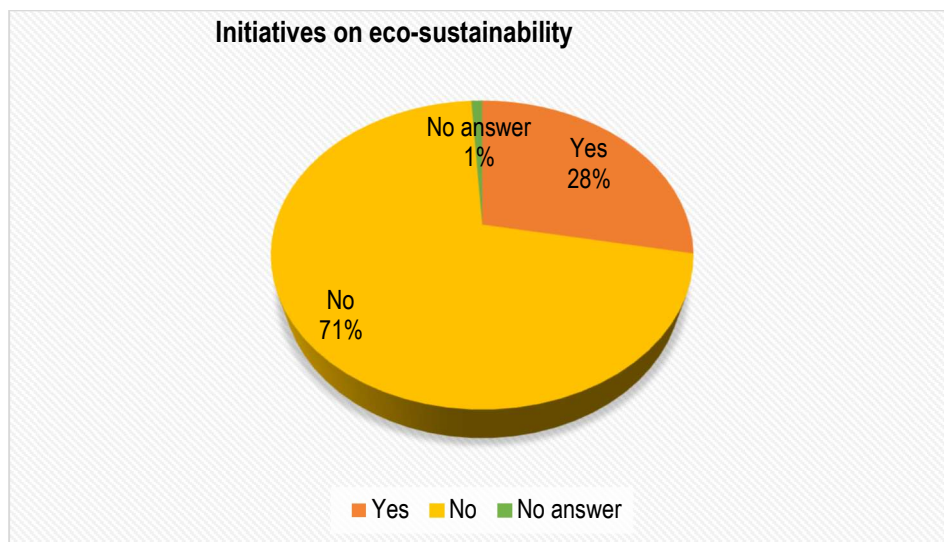
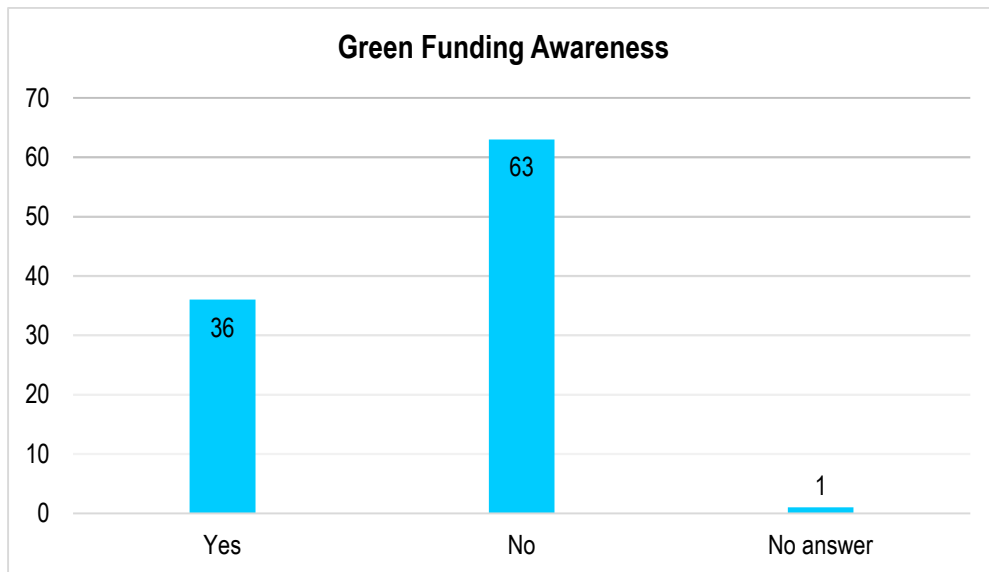


Chart 15. Answer to question 13 'Are you aware of European/regional Green Economy funding?'



Questions 14 and 15 represent a small interval to get a snapshot and understand the consumption habits of the population, whether their purchasing power has decreased in recent years and which consumer good they spend more money on.

Chart 16 shows us that in the last two years purchasing power has decreased for 78% of the sample, while Chart 17 shows us that the consumer good on which more money is spent is food, followed by clothes.

Chart 16. Answer to question 14: 'Has your purchasing power decreased in the last two years?'

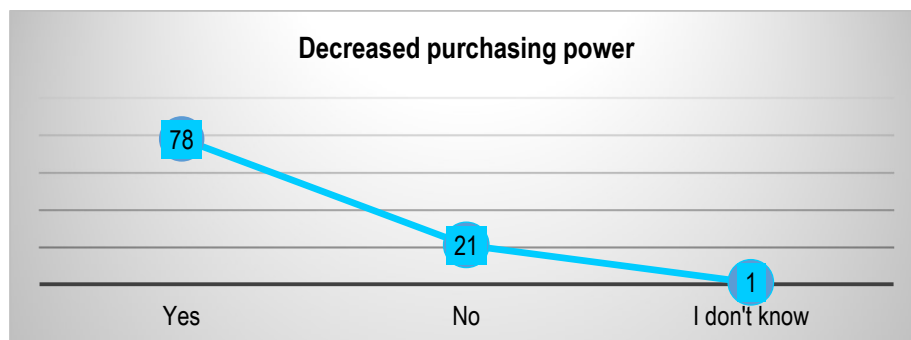
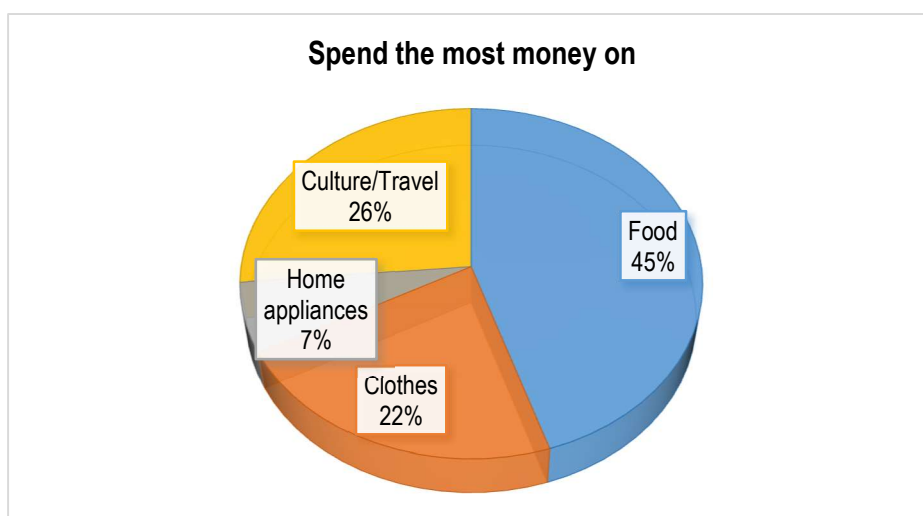


Chart 17. Answer to question 15 'Which consumer good do you spend the most money on?'



Hypothesis H3 must be validated by questions 16, 17, 18, 19 and 20. The answers to these questions will help us to understand if the population relies on the conversion of the old refinery into a biorefinery, for the economic development of the city of Gela.

We will also understand if the population blames the closure of the historic petrochemical plant for the period of economic crisis currently taking place in the area.

The first question (16) is aimed at illustrating the thought of the population on the current economic condition of the City, we can see from *Chart 18* that 95% of the subjects believe that the area is going through a period of crisis. In the next Chart, *Chart 19*, we discover that more than half of the population, 72%, blame the conversion of the petrochemical plant into a biorefinery.

Chart 18. Answer to question 16: 'Do you notice a period of economic crisis in your area?'

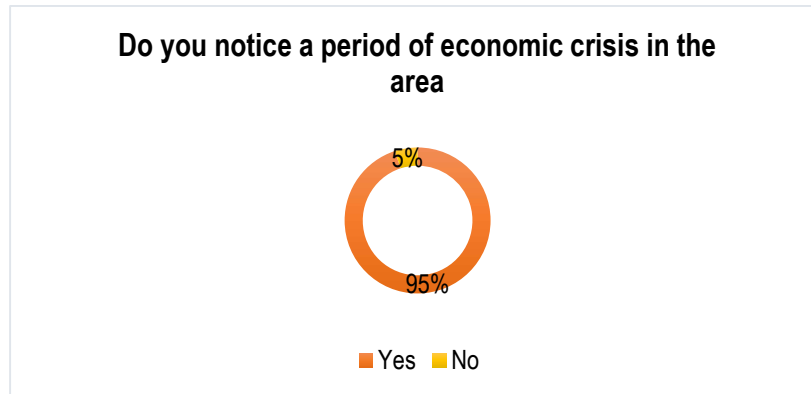
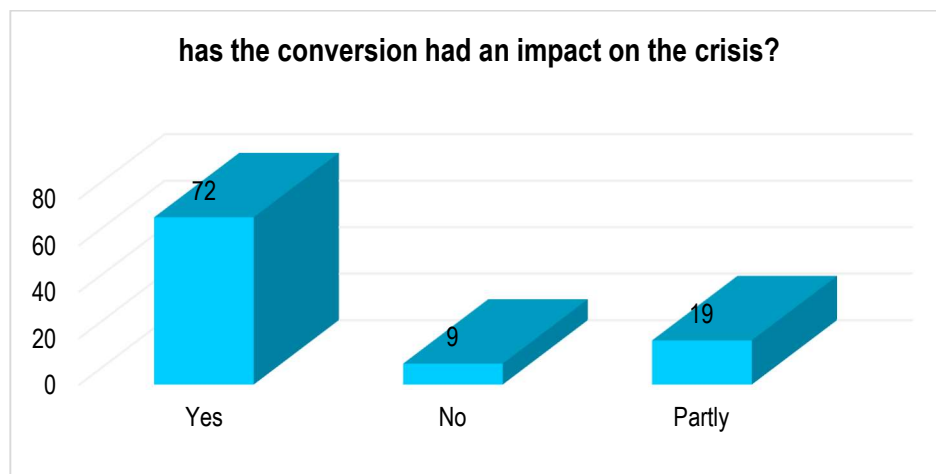


Chart 19. Answer to question 17 'In your opinion, has the conversion of the historic petrochemical site into a biorefinery had an impact on the crisis in the area?'



Continuing to investigate the sample's opinion on the conversion, we note from Chart 20 that the percentages are well distributed and that the largest percentage of the sample, 35%, believes that the conversion will benefit the whole area. In the opposite position, with 23%, we find instead a slice of the sample that thinks that it will not bring development for anyone.

Chart 21 shows us how without hesitation, with a percentage of 83%, the sample is convinced that the area has a natural inclination. This inclination is reflected in Chart 22, where 41% of those interviewed believe in tourism and 36% in agriculture, followed by university with 9% and biorefinery with 8%.

Chart 20. Answer to question 18 'A new biorefining hub can bring economic development: to individuals, to companies, to the whole area, to nobody'.

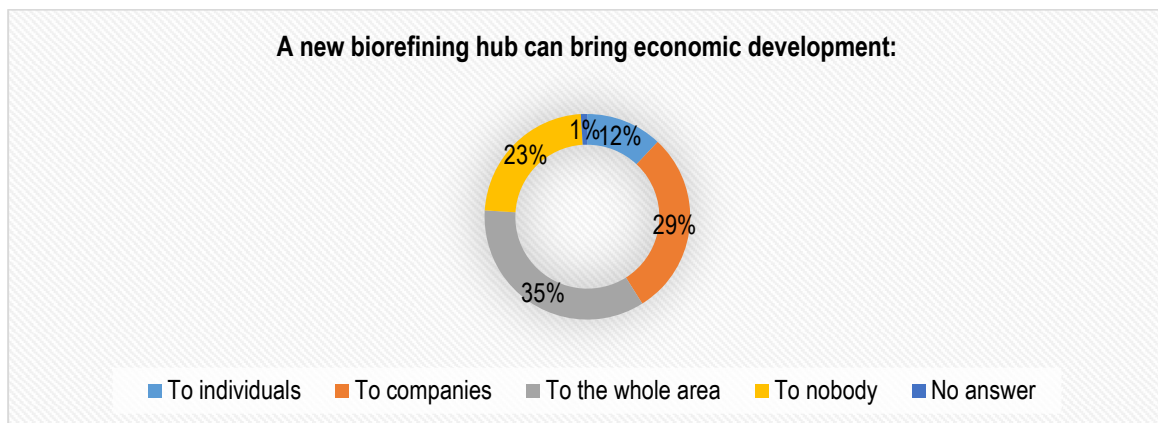


Chart 21. Answer to question 19 "Do you think the area can have a particular inclination?"

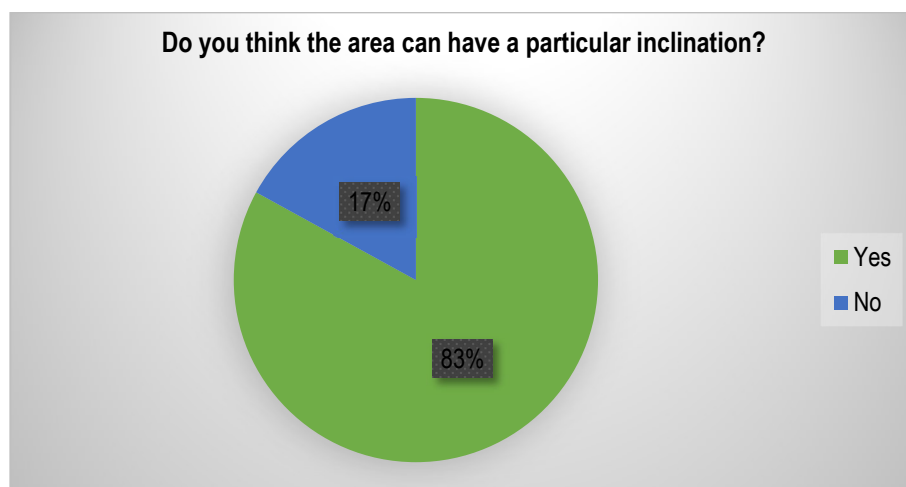


Chart 22. Answer to question 20 'If so, which inclination?'

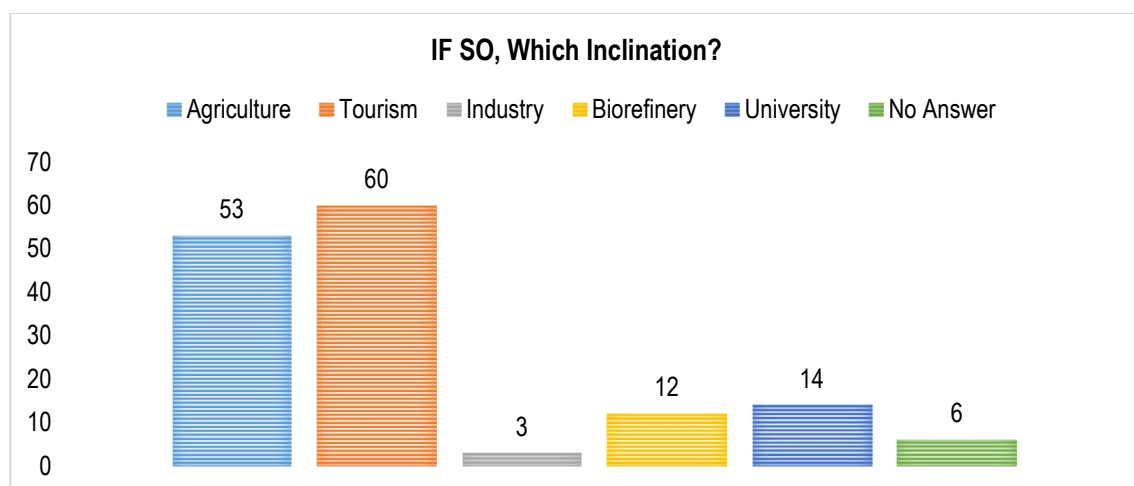
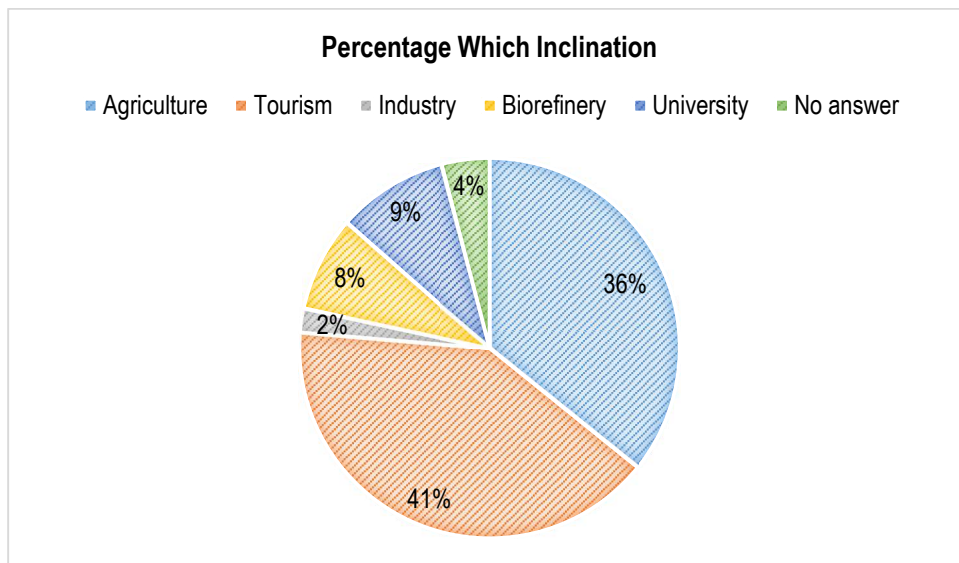


Chart 23. Answer to question 20 'If so, which inclination?' (In percent)



In the comparison between stakeholders, analysing questions 12 and 13 in an attempt to identify 'innovators', *i.e.* the category that has begun to implement a change, the data are distributed and illustrated in Tables 5 and 6.

Environmental Associations and Social Attractors have taken part in initiatives on eco-sustainability with 100%, followed by Trade Associations with 50%, and Political Representatives and Head Teachers with 40%, and lastly Businesses and Professional Orders with 33%. The lowest percentage, on the other hand, concerns Citizens, where 83% say that they have not participated.

Table 6 shows that it is mostly the Cultural Attractors and Citizens who are not aware of funding to invest in the Green Economy, whereas environmental associations and companies move in the opposite direction.

Table 5. Comparison between stakeholders. Answer to question 12 'Have you participated in cultural initiatives/meetings on eco-sustainability in the last year?'

'Have you participated in cultural initiatives/meetings on eco-sustainability in the last year?'	Yes	No
Citizens	17%	83%
Companies	33%	67%
Trade Associations	50%	50%
Professional Associations and Boards	33%	67%
Representatives of Political Institutions	40%	60%
Head Teachers	40%	60%
Environmental associations	100%	0%
Cultural Territorial Attractors	100%	0%

Table 6. Comparison between stakeholders. Answer to question 13 'Are you aware of European/regional Green Economy funding?'

'Are you aware of European/regional Green Economy funding?'	Yes	No	no answer
Citizens	26%	74%	
Companies	73%	27%	
Trade Associations	62%	25%	13%
Professional Associations and Boards	33%	67%	
Representatives of Political Institutions	40%	60%	
Head Teachers	20%	80%	
Environmental associations	100%	0%	
Cultural Territorial Attractors	0%	100%	

Discussion and Conclusion

The results obtained from the research only confirm hypothesis H3, denying H1 and H2.

The analyses carried out show that in the majority of the population surveyed there is still no lifestyle in support of the circular economy, a term that catches 29% of the sample off-guard – when asked ‘Are you a supporter of the circular economy?’, they answer ‘I don’t know’.

Despite the fact that 44% of the population say they lead a lifestyle that protects the environment and 38% say they do so occasionally, there are no spontaneous and concrete actions in which this thought is manifested; the vast majority of the sample, 83%, in favour of a lifestyle that protects the environment, say they sort waste (action imposed by the municipality of residence) as the main action, while only 5% use electric vehicles and only 7% use public transport or bicycles.

We can therefore consider hypothesis H1 not true: the population advocates a lifestyle in support of the circular economy.

However, we should highlight the very encouraging data that comes from 80% of the sample that have recycled something in their lives.

71% of the population have never participated in initiatives and cultural meetings on eco-sustainability and 63% are not aware of European or regional funding regarding the Green Economy, this figure is enough to confirm that hypothesis H2 is not true: that is, the population has begun to implement change by investing in Green Economy funding, both at the entrepreneurial level and in cultural education.

95% of the sample noticed a period of economic crisis in the area, to which the conversion of the historic petrochemical site into a biorefinery contributed according to 72% of the sample. Despite this belief, the population still believes that a new biorefining hub can bring economic development to the whole area, the percentage of 35% (the highest for this question) therefore makes us confirm hypothesis H3: *i.e.* the population trusts in the conversion of the ENI company for the economic development of the city of Gela. The very small gap should also be noted between those who believe that it will bring economic development to companies, represented by 29%, and those who believe that it will not bring development to anyone, 23%.

An analysis among stakeholders reveals that the first promoters of change, who have shown a higher percentage of participation in cultural activities, are represented by Environmental Associations and Cultural Attractors, followed by Trade Associations.

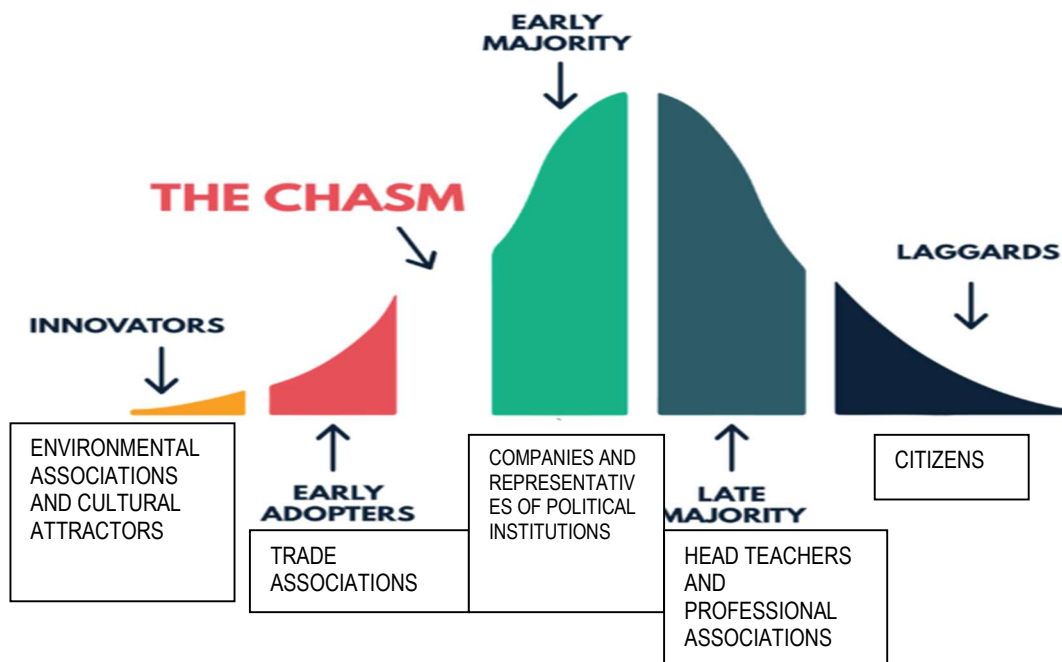
It is always the Environmental Associations, followed this time by Businesses, the leading stakeholders for Green funding.

The return of the data also requires considerations on some main points.

Proceeding in order, question 8 (Which of the following actions do you usually take?) shows that among the actions usually taken, 83% of the sample sort waste, but waste sorting is mandatory in the municipality of Gela, so actually it is a figure that shows a lack of sensitivity to environmental sustainability. When asked question 12 (Have you participated in cultural initiatives/meetings on eco-sustainability in the last year?), 71% answer that they have not participated in cultural initiatives/meetings on eco-sustainability in the last year; this high percentage suggests that such initiatives have probably not been promoted on the area. Continuing on, it is interesting to note that whereas in question 17 (In your opinion, has the conversion of the historic petrochemical site into a biorefinery had an impact on the crisis in the area?), 72% say that the conversion of the historic petrochemical site into a biorefinery has had an impact on the crisis in the area, in question 19 (Do you think the area can have a particular inclination?), 83% are convinced that the area has its own natural inclination, which is for 41% tourism and for 36% agriculture, followed by university with 9% and biorefinery with 8%. Therefore, if on the one hand the population blames the conversion of the petrochemical plant for the crisis, on the other hand they do not believe it is the key to economic recovery.

Finally, tables 5 and 6 with the comparison between stakeholders suggest that Environmental Associations and Cultural Attractors are our ‘innovators’, followed by Trade Associations. Trying to reconstruct, with our data, the Chart by G. A. Moore would look like this:

Chart 24. "Innovators", chart by G. A. Moore (1991)



Source: Moore (1991).

People were asked to answer these questions because we were interested in understanding, above all, what are not so much the economic and political barriers, but the cultural and psychological ones, which seem to be less evident to the change in environmental sustainability.

The economic crisis, in fact, could make us understand the importance of energy efficiency, of energy produced with renewable sources. When individuals are forced to think about what they can and must do for their survival and subsistence, they actively act on their lifestyles with a problem-solving approach that leads them to empower themselves and develop skills and competences. This may be the time to say that there are different ways of living, ways that are less impacting on one's health and the planet and that allow us to spend less, for example producing energy with a solar panel on a roof or producing food with urban gardens, etc. (Sethi 2017).

The transition town movement is very interesting from this point of view because it acts on values and symbols, you feel part of a movement in which the active role of each one is fundamental to achieve a collective goal, and from our analysis environmental associations and cultural attractors could be potential and essential partners to fill 'The Chasm', define communication strategies and trigger dynamics of involvement and participation, because they are closely linked to the area and the life of the city.

References

- [1] Bowles, S., Choi, J. K. and Hopfensitz A. 2003. The coevolution of individual behaviors and group level institutions. *Journal of Theoretical Biology*, 223(2): 135–147.
- [2] Corrias, P. and Felici, B. (2019), *Accettazione sociale delle tecnologie energetiche: il territorio tra vocazioni, sviluppo locale e obiettivi di decarbonizzazione*, Enea, Frascati.
- [3] De Luca, G. 2012. *Effetto NIMBY*, Dizionario di economia e finanza, Treccani. Available at: http://www.treccani.it/enciclopedia/effetto-nimby_%28Dizionario-di-Economia-e-Finanza%29/
- [4] Disconzi, F. 2011. *Scenari energetici di lungo periodo, vincoli tecnici ed ambientali*. Available at: <http://paduaresearch.cab.unipd.it/3506/1/phdtesi-fabio-disconzi.pdf>
- [5] Ferrajolo, A. 2015. *Appunti di economia dell'energia nell'età contemporanea*, Brignoli Edizioni, Caserta.
- [6] Geels, F. W. and Schot, J. 2007. Typology of sociotechnical transition pathways. *Research Policy*, 36(3): 399-417.
- [7] De Luca, G. 2012. *Dizionario di Economia e Finanza*.

- [8] Laino, A. 2016. *L'innovazione nell'analisi economica*, Franco Angeli, Milano.
- [9] Laughlin, P. 2015. Holistic customer insight as an engine of growth. *Institute of Direct & Digital Marketing (IDM), Journal of Direct, Data & Digital Marketing Practice*, 16(2): 75-79.
- [10] Lissoni, F. 2000. *La diffusione delle innovazioni*, in F. Malerba (a cura di), *Economia dell'innovazione*, Carocci, Roma.
- [11] Loudon, D. L. and Bitta, A.J. D. 1979. *Consumer behavior: concepts and applications*, New York, McGraw-Hill.
- [12] Magini, M. 1976. *L'Italia e il petrolio tra storia e cronologia*, Mondadori, Roma-Milano.
- [13] Magnani, N. 2018. *Transizione energetica e società. Temi e prospettive di analisi sociologica*, Milano, Franco Angeli.
- [14] Markard, J., Raven, R. and Truffer B. 2012. Sustainability transitions: An emerging field of research and its prospects. *Research Policy*, 41(6): 955-967.
- [15] Mascia, M.B. and Mills, M. 2018. When conservation goes viral: The diffusion of innovative biodiversity conservation policies and practices. *Conservation Letters*, 11(3): 1-9.
- [16] Moore, G. A. 1991. *Crossing the Chasm, Marketing and Selling High-Tech Products to Mainstream Customer*, New York, HarperCollins Publishers (revised 1999 and 2004).
- [17] Moore, G.A. 2013. Why Crossing The Chasm Is Still Relevant, Dan Schawbel, Forbes, 17 December 2013. Accessed 30 August 2017.
- [18] Patrucco, D. 2018. *Transizione energetica, i fattori umani e sociali* Available at: <https://www.qualenergia.it/articoli/transizione-energetica-fattori-umani-e-sociali-non-possono-essere-trascurati/>
- [19] Rodger, W. 1980. *Effetto NYMBY", Not In My Back Yard*. Available at: http://www.treccani.it/enciclopedia/effetto-nimby_%28Dizionario-di-Economia-e-Finanza%29/
- [20] Rogers, E. M. 2003. *Diffusion of Innovations*, 5th Edition, London, Simon and Schuster.
- [21] Rotmans, J., Kemp, R. and van Asselt, M. 2001. More evolution than revolution: transition management in public policy. *Foresight*, 3(1): 15-31.
- [22] Schumacher, E. F. 1973. *Small is beautiful: a study of economics as if people mattered*, London, Blond & Briggs.
- [23] Sethi, S. 2016. *Bread, wine, chocolate: the slow loss of foods we love*, HarperCollins Publishers Inc, Scotland.
- [24] Shove, E., Pantzar, M. and Watson, M. 2012. *The dynamics of social practice: everyday life and how it changes* Sage.
- [25] Shove, E. and Warde, A. 2002. *Inconspicuous consumption: the sociology of consumption, lifestyles and the environment*, in Dunlap R., Buttel F., Dickens P., Gijswijt A. (a cura di), *Sociological theory & the environment: classical foundations, contemporary insights*, Lanham, Rowman and Littlefield.
- [26] Spaargaren, G. 2011. Theories of practices: agency, technology, and culture. Exploring the relevance of practice theories for the governance of sustainable consumption practices in the new world-order. *Global Environmental Change*, 21(3): 813-822.
- [27] Stanley, H. E. 1971. *Introduction to phase transitions critical phenomena*, New York, Oxford University Press.
- [28] Stone, D. 1999. Learning lessons and transferring policy across time, space and disciplines. *Politics*, 19(1): 51-59.
- [29] The Age of Persuasion (January 8, 2010). "Season 5: It's Not Easy Being Green: Green Marketing". CBC Radio. Retrieved 8 January 2011.

- [30] Urry, J. 2000. *Sociology beyond societies: mobilities for the twenty-first century*. International library of sociology, London, Routledge.
- [31] Walker G., et al. 2010. Trust and community: exploring the meanings, contexts and dynamics of community renewable energy. *Energy Policy*, 38(69): 2655-2663.
- [32] Wejnert, B. 2002. Integrating models of diffusion of innovations: a conceptual framework. *Annual Review of Sociology*, 28(1): 297-326.
- [33] Wolsink, M. 2007. Wind power implementation: the nature of public attitudes: equity and fairness instead of 'backyard motives'. *Renewable and Sustainable Energy Reviews*, 11(6): 1188-1207.
- [34] Wüstenhagen, R., Wolsink, M. and Burer, M. J. 2007. Social acceptance of renewable energy innovation: an introduction to the concept. *Energy Policy*, 35(5): 2683–2691.

Appendix

The questionnaire is anonymous.

1 SEX: ☐ Female ☐ Male ☐ Other

2 AGE: _____

3 CITIZENSHIP: _____

4 RESIDENCE: _____

☐ Center ☐ Outskirts ☐ Residential area

5 EDUCATION:

☐ None ☐ Primary/Middle school ☐ High school

☐ Degree ☐ Postgraduate specialization

6 EMPLOYMENT:

_____ ☐ Unemployed

7 DO YOU LEAD A SUSTAINABLE LIFESTYLE THAT PROTECTS THE ENVIRONMENT?

☐ Yes ☐ No ☐ Occasionally

8 WHICH OF THE FOLLOWING ACTIONS DO YOU USUALLY TAKE? (multiple answers are possible)

☐ I sort waste

☐ I pay attention to waste of water, energy and food

☐ I use public transport and/or bicycle

☐ I use electrical vehicles

9 HAVE YOU EVER RECYCLED ANYTHING? (e.g. plastic or glass bottles, shopping bags, old cartons, textiles, etc.)

☐ Yes ☐ No

10 ARE YOU A SUPPORTER OF THE CIRCULAR ECONOMY?

☐ Yes ☐ No ☐ I don't know

11 DO YOU CONSUME ORGANIC FOOD?

☐ Yes ☐ No ☐ Occasionally

12 HAVE YOU PARTICIPATED IN CULTURAL INITIATIVES/MEETINGS ON ECO-SUSTAINABILITY IN THE LAST YEAR?

☐ Yes ☐ No

13 ARE YOU AWARE OF EUROPEAN/NATIONAL/REGIONAL GREEN ECONOMY FUNDING?

☐ Yes ☐ No

14 HAS YOUR PURCHASING POWER DECREASED IN THE LAST TWO YEARS?

☐ Yes ☐ No

15 WHICH CONSUMER GOOD DO YOU SPEND THE MOST MONEY ON?

☐ Food

☐ Clothes

☐ Home appliances

☐ Culture/Travel

16 DO YOU NOTICE A PERIOD OF ECONOMIC CRISIS IN THE AREA?

☐ Yes ☐ No

17 IN YOUR OPINION, HAS THE CONVERSION OF THE HISTORIC PETROCHEMICAL SITE INTO A BIOREFINERY HAD AN IMPACT ON THE CRISIS IN THE AREA?

☐ Yes ☐ No ☐ Partly

18 A NEW BIOREFINING HUB CAN BRING ECONOMIC DEVELOPMENT:

☐ to individuals ☐ to companies ☐ to the whole area ☐ to nobody

19 DO YOU THINK THE AREA CAN HAVE A PARTICULAR INCLINATION?

☐ Yes ☐ No

20 IF SO, WHICH ONE?

☐ Agriculture ☐ Tourism ☐ Industry ☐ Biorefinery ☐ University

ASSESSING THE EFFECTS OF REAL EXCHANGE RATE DEPRECIATION ON THE MOROCCAN ECONOMY: EVIDENCE BASED ON SVAR APPROACH WITH SIGN RESTRICTIONS

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Abstract

The purpose of this paper is to analyze the dynamic response of a small subset of variables to exchange rate shocks by using a new method based on a set of theory-consistent sign restrictions for the purpose of identifying shocks over time (1995Q1–2019Q1) in the Moroccan economy. It is important to note that the current account presents the so-called “J-curve” phenomenon. Additionally, Morocco entered into a period of deeper and longer recession and higher inflation following the dirham’s depreciation. Following a real depreciation, the output has little effect on improving the current account balance. Our results suggest that the monetary authorities reacted immediately to exchange rate shocks by raising their interest rates to prevent the economy from falling into deflation.

Keywords: contractionary; exchange rate shocks; vector autoregression; sign restrictions.

JEL Classification : C51; E30; F41.

Introduction

For transition economies, the reaction of real output to depreciation or devaluation⁵⁰ becomes a major challenge, not only for researchers but also for econometricians. The contribution of this study to the literature lies primarily in elucidating the conditions under which depreciations are more likely to be contractual/expansionary in the economy. The importance of understanding the effect of depreciation on output cannot be ignored, as it provides important insights for policy-making.

The purpose of this paper is to study the empirical relationship between production and the depreciation of the Moroccan dirham. We use a fairly comprehensive vector autoregressive (VAR) model, as it allows the endogeneity of the exchange rate to be taken into account. Many previous studies that have adopted VAR models (e.g. Kamin and Rogers 2000; Ahmed *et al.* 2002; Shi 2006; Kim and Ying 2007 and Özcan 2020) have used the Choleski decomposition to identify shocks. It is only relatively recently that, in the devaluation literature, the VAR model based on the sign restriction method has been used.

⁵⁰The terms “depreciation” and “devaluation” are used interchangeably in this paper, as the focus is on estimating the effects of real exchange rate changes on output.

This remainder of this article is organized as follows. Section 2 calculates the new effective exchange rate index (EERI), while Section 3 presents bivariate data analysis between the real exchange rate and output. Section 4 presents a complete VAR model, including analysis of the sign restriction methodology. Estimation results and robustness checks are presented in Sections 5 and 6, respectively. Finally, conclusions are presented in Section 7.

1. The New Effective Exchange Rate Index for The Dirham

In this section, we aim to estimate the exchange rate index of the Moroccan dirham, or the EERI, weighted according to trade (includes the US dollar, euro, yen, Chinese renminbi, and pound sterling). The importance of currencies depends on the percentage of trade with Morocco. In order to be able to calculate this index, the most important exchange rate would be that of the euro, which represents the importance of Europe in Moroccan trade. This effective exchange rate better reflects the impact of the exchange rate on macroeconomic conditions than a bilateral rate. The nominal EERI is an index of a weighted average of bilateral exchange rates. We have estimated the real EERI, which is considered as the nominal EERI adjusted by a measure of relative prices or costs, as its changes take into account both the evolution of the nominal exchange rate and the inflation differential vis-à-vis trading partners. The EERI has a variety of applications for both policy and market analysis: as a measure of international competitiveness; as a component of representative indices of monetary and financial conditions; as a criterion for assessing the transmission of external shocks; and as an intermediate monetary policy objective or operational objective.⁵¹ It is therefore essential for authorities and stakeholders to have accurate EERI measures. In our study, we consider an exchange rate that is constructed so that a decrease reflects a real appreciation of the dirham.

The methodology proposed for constructing the trade-weighted index of the dirham is as follows. The current calculation method is based on the weighted geometric average of a basket of currencies chosen to represent the major share of Morocco's bilateral trade in goods and services. For a base period rated 0, the real effective exchange rate (EERI) index of the dirham (i) against a foreign currency of the partner countries (j), where $\omega_{j/i}$ is the weight of currency i.

1.1 Weight for the Effective Exchange Rate Index (EERI)

For the j currencies included in the index, the weight of an individual country's currency is based on the country's share of Morocco's trade in goods and services:

$$S_i = \frac{X_i^T + M_i^T}{\sum_{i=1}^n (X_i^T + M_i^T)}, \quad \sum_{i=1}^j S_i < 1$$

where X represents total exports (goods and services) from country (i) to country (j), M represents total imports from j to i, and "n" is the number of Morocco's main trading partners.

The weights of the currencies included in the EERI are then calculated by resizing the trading shares (per ST) so that they total 100:

$$\omega_i = \frac{X_i^T + M_i^T}{\sum_{i=1}^n (X_i^T + M_i^T)} \cdot S^T = S_i \cdot S^T \quad \text{Où} \quad S^T = \frac{1}{\sum_{i=1}^j S_i}$$

Where S^T is the inverse of the share of trade represented by the currencies used in the EERI basket.

Therefore, the actual EERI is calculated according to the following formula:

$$\begin{aligned} EERI_{t/0}^i &= \left[\frac{\epsilon M_t}{\epsilon M_0} \times \frac{CPI_t^{euro}}{CPI_t^2} \times \frac{E_t^2}{E_0^2} \right]^{\omega_{2,i}} \times \left[\frac{\epsilon M_t}{\epsilon M_0} \times \frac{CPI_t^{euro}}{CPI_t^3} \times \frac{E_t^3}{E_0^3} \right]^{\omega_{3,i}} \times \dots \\ &\times \left[\frac{\epsilon M_t}{\epsilon M_0} \times \frac{CPI_t^{euro}}{CPI_t^j} \times \frac{E_t^j}{E_0^j} \right]^{\omega_{j,i}} \times \left[\frac{\epsilon M_t}{\epsilon M_0} \right]^{\omega_{1,i}} \times EERI_0 EERI_{t/0}^i \\ &= \prod_{j=1}^n \left[\frac{CPI_t^{euro}}{CPI_t^j} \times \frac{E_t^j}{E_0^j} \right]^{\omega_{j,i}} \times \frac{\epsilon M_t}{\epsilon M_0} \times EERI_0 \end{aligned}$$

where:

⁵¹For example, Singapore uses this type of exchange rate as an operational objective, with foreign exchange intervention to control the currency rate; for more details, see Monetary Authority of Singapore (2001).

ϵM_t is the bilateral real exchange rate; units of dirhams per euro (euro/MAD);

E_t^i is the unit of euros per each unit of foreign currency ($i = 2, \dots, j$);

ω_i is the weight of foreign currency ($i = 2, \dots, j$);

ω_1 is the weight of the euro;

CPI_t^j is the price level in the foreign country j ;

CPI_t^{euro} is the price level in the euro zone;

" t " is the current period;

" j " is the number of currencies included in the EERI;

EERI0 is equal to 100; and

0 is the base period.

This weighting system is based on the work of Turner and Van'tdack (1993). The weights, derived from trade flows in goods, reflect both direct bilateral trade and competition in third countries through double weighting. This method of weighting based on trade has its theoretical basis in Armington (1969) and implicitly assumes the existence of a single type of product, differentiated according to its country of origin, with a constant elasticity of substitution.

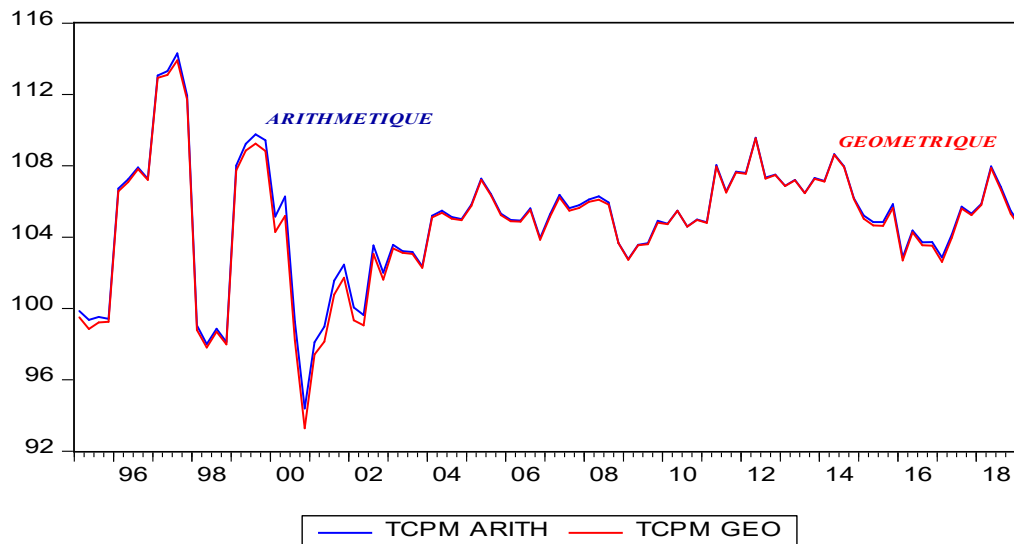
An older method for the often-used EERI calculation, based on the arithmetically weighted average of a basket of currencies, is also chosen to present Morocco's trade structure as illustrated in the figure below with a view to comparing this with the previous method. Specifically, at each moment t , the EERI is calculated using the following formula:

$$EERI_{t/0}^i = \left[\omega_{1,i} \left[\frac{\epsilon M_t}{\epsilon M_0} \right] + \omega_{2,i} \left[\frac{\epsilon M_t}{\epsilon M_0} \times \frac{CPI_t^{euro}}{CPI_t^2} \times \frac{E_t^2}{E_0^2} \right] + \omega_{3,i} \left[\frac{\epsilon M_t}{\epsilon M_0} \times \frac{CPI_t^{euro}}{CPI_t^3} \times \frac{E_t^3}{E_0^3} \right] + \dots + \omega_{j,i} \left[\frac{\epsilon M_t}{\epsilon M_0} \times \frac{CPI_t^{euro}}{CPI_t^j} \times \frac{E_t^j}{E_0^j} \right] \right] \times EERI_0$$

$$EERI_{t/0}^i = \left[\omega_{1,i} + \omega_{2,i} \left[\frac{CPI_t^{euro}}{CPI_t^2} \times \frac{E_t^2}{E_0^2} \right] + \omega_{3,i} \left[\frac{CPI_t^{euro}}{CPI_t^3} \times \frac{E_t^3}{E_0^3} \right] + \dots + \omega_{j,i} \left[\frac{CPI_t^{euro}}{CPI_t^j} \times \frac{E_t^j}{E_0^j} \right] \right] \times \left[\frac{\epsilon M_t}{\epsilon M_0} \right] \times EERI_0$$

Figure 1 shows the evolution of the EERI according to the two calculated methods.

Figure 1. The evolution of the EERI according to the two calculated methods



Note: TCPM represents EERI.

2. Bivariate Data Analysis

The feedback loop between output and the real exchange rate describes, first, how a depreciation of the real exchange rate could have both an expansionary and a restrictive effect on output. Second, it shows how real output growth could lead to an appreciation or depreciation of the real exchange rate.

According to the Balassa–Samuelson effect, in fast-growing economies, the relative price of non-tradable goods would rise more rapidly and thus lead to an appreciation of the real exchange rate over time. However, existing empirical studies suggest that the effects of growth on real exchange rates are non-existent or weak (for a comprehensive review of the empirical evidence, see Tica and effet 2006; Choudhri and Khan

2005; Chinn and Johnston 1996). At the same time, and paradoxically, advanced countries are following the conventional wisdom that growth is accompanied by real long-term appreciations, widely known as the Balassa–Samuelson hypothesis (BSH), while developing countries are moving in the opposite direction.

We first assess the bivariate relationship between the real exchange rate and seasonally adjusted GDP using cross-correlations with future values and lagged values up to four quarters (in our study). To make the results robust we use simple detrending methods such as linear filters, three filters are used: linear detrending; first difference; and the Hodrick–Prescott (HP) filter.

The bivariate correlations procedure calculates Pearson's correlation coefficient, Spearman's rho, and Kendall's tau-b, along with their levels of significance. In the present study, we use the Pearson's correlation coefficient. In case of data not being normally distributed or if they have ordered categories, we use Kendall's tau-b or the Spearman correlation, which measures the association between rank orders. Correlation coefficients range from -1 (perfect negative relationship) to $+1$ (perfect positive relationship). A value of zero indicates the absence of a linear relationship. When interpreting the results, we cannot conclude from the existence of a significant correlation that a causal relationship exists; it is the causality test in the Granger sense that will bring out their causality in pairs.

We use the real exchange rate of the dirham, which is constructed so that a decrease reflects a real appreciation of the national currency. Table 1 presents the representative short-term cross-correlations between the real exchange rate and output with lags of -4 , -2 , -1 , 0 , 1 , 2 , and 4 . A positive (negative) lag indicates the number of quarters in which real GDP (industrial production index) causes (lags) effects on the real exchange rate. In other words, output growth in the open economy is exogenous to changes in the real exchange rate. While the consequences of a persistent decline in the real exchange rate on economic growth can be inferred from the correlation with negative lags, the correlation with positive lags suggests the possible inverse causal effect of output growth on the real exchange rate.

Table 1. Cross-correlations between exchange rate and output.

Lags Filters	-4	-3	-2	-1	0	1	2	3	4
HP	0.018	0.071	0.043	0.053	0.002	0.021	0.027	0.048	0.038
DM	0.32	0.33	0.34	0.36	0.377	0.37	0.36	0.35	0.33
DIFF	-0.022	0.005	-0.048	-0.029	-0.067	0.01	-0.01	-0.0006	-0.057

Source: Authors' calculations.

Notes: DM=linear detrending; DIFF=first difference; HP=Hodrick–Prescott filter. A positive (negative) detrend indicates the number of quarters whose real output typically has a significant impact (lag) on the real exchange rate.

Table 2. Granger causality tests between the real exchange rate and output.

	Lag	HP	DM	DIFF
RER causes real Y in the Granger sense	-1	0.05(0.81)	0.04(0.83)	0.12(0.72)
	-2	0.07(0.92)	0.20(0.81)	0.04(0.95)
	-3	0.21(0.88)	0.38(0.76)	0.80(0.49)
	-4	0.19(0.93)	0.74(0.56)	0.52(0.71)
Y causes RER in the Granger sense	-1	0.90(0.34)	0.73(0.39)	0.26(0.61)
	-2	0.46(0.62)	0.40(0.66)	0.18(0.83)
	-3	0.50(0.68)	0.49(0.68)	0.27(0.84)
	-4	0.42(0.79)	0.47(0.75)	0.19(0.94)

Source: Authors' calculations.

Notes: The statistics shown are F-statistics with probability values in parentheses. DM=linear detrending; DIFF=first difference; HP=Hodrick–Prescott filter; RER=real exchange rate; Y=real output; RER ... Y tests the hypothesis that the real exchange rate causes real GDP in the Granger sense; Y ... RER tests the hypothesis that real economic growth seems to cause, in the Granger sense, the real exchange rate.

The correlations with negative shifts are clearly positive in our case. That is, real exchange rate depreciation is followed by output growth. For example, devaluations or depreciations are uniformly associated

with the expansion of the Moroccan economy. This result is extremely sensitive to the mechanisms of the HP filter and the linear detrending method.

In order to further explore the bivariate relationship, we utilize Granger causality tests (see Table 2). Foreign GDP, foreign interest rate, current account, and real money supply are included to control for external influences that simultaneously affect the real exchange rate and output. From Table 2, it is clear that there is an absence of causality in both directions.

3. VAR Model with Sign Restrictions

This section is divided into two subsections: the first establishes the basic model; and the second illustrates the implementation of the sign restriction approach, following Mountford and Uhlig (2005).

3.1 Model

The relationships documented (positive or negative) between real output and the real exchange rate in the previous section may result from a spurious correlation, where both variables are affected by a third factor. For example, large changes in oil prices can depress output and depreciate the real exchange rate, causing it to move in an opposite direction. It is therefore important to monitor macroeconomic conditions and to distinguish between exchange rate movements that can be considered as exogenous policy shocks and those that are reactions to macroeconomic events.

This work focuses on full vector autoregression (VAR) models, consisting of six endogenous variables: real output [as measured by the seasonally adjusted Industrial Production Index (IPI) (Y)]; real exchange rate (RER); current account to GDP (CA); price level (as measured by the Consumer Price Index (CPI)); and real money supply (real M2). As a short-term interest rate, the three-month money market interest rate enters the VAR as the sixth variable.

In addition, two exogenous variables, the foreign IPI (Y^*) and the foreign interest rate (i^*), are incorporated to capture external shocks. The short-term money market interest rate and euro area real GDP are used as the foreign interest rate and foreign real output. In addition, although Uhlig (2005) and Mountford and Uhlig (2009) did not include deterministic terms (e.g. a constant or a time trend) in their VAR models, we include a time trend to obtain a better impulse response. In addition, we retain the VAR(p) model with $p^*=1$ (a lag), which minimizes the information criteria of Akaike and Schwarz in our case. Interception and time trend are also contained in the VAR.

The real money supply is included in our study. According to Shahbaz et al. (2012), money supply affects both investment and production. An increase in the money supply lowers the interest rate, reduces borrowing costs, and encourages investment that can increase domestic production. In addition, a larger money supply will reduce the value of domestic money. This work also incorporates the price level to control the price environment of the economy.

According to Mejia-Reyes et al. (2010), an inflationary environment can have a negative impact on output because it can lead to an inefficient allocation of resources due to relative price distortions and higher administrative costs for firms. Current accounts are included for two reasons. On the one hand, this allows direct examination of the effect of exchange rate fluctuations on output through the demand channel (net exports). On the other hand, the current account implicitly includes information on capital flows, as the current and capital accounts represent a symmetrical picture of each other. Information on capital flows is extremely important. According to Kamin and Rogers (2000), capital flow shocks have played an important role in changes in the real exchange rate and output in Mexico. Reinhart (2000) also argued that devaluation can lead to a loss of access to international financial markets and thus contractionary effects on output. Kim and Ying (2007) also included this variable in their model.

The short-term interest rate and the euro zone IPI are included to take into account European market conditions. According to Kim, Ren and Lian (2014), two exogenous variables are including, foreign (US) GDP and the foreign interest rate (the three-month US Treasury bill rate) to capture external shocks. Real output and the interest rate are naturally included in this work.

These data come from three different sources: the International Financial Statistics (IFS); the Directorate of Trade Statistics (DOTS); and the Central Bank. They are quarterly, seasonally adjusted, and cover the period 1995Q1 to 2019Q1.

Equation (1) summarizes the model in a compact and reduced form:

$$\begin{bmatrix} Y_t \\ TCR_t \\ CPI_t \\ Real\ M2_t \\ CA_t \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \\ c_3 \\ c_4 \\ c_5 \end{bmatrix} + A_{ij}(L) \begin{bmatrix} Y_{t-1} \\ TCR_{t-1} \\ CPI_{t-1} \\ Real\ M2_{t-1} \\ CA_{t-1} \end{bmatrix} + B_{ij}(L) \begin{pmatrix} \Delta Y_{t-1}^* \\ \Delta i_{t-1}^* \end{pmatrix} + \begin{bmatrix} e_t^1 \\ e_t^2 \\ e_t^3 \\ e_t^4 \\ e_t^5 \end{bmatrix} \quad (1)$$

All variables are expressed in logarithms, except for the interest rate and the current account-to-GDP ratio. There are several features of the model. First, the VAR model takes into account internal and external shocks that may simultaneously induce devaluation (depreciation) and contraction of the economy, such as a reversal of capital inflows or a decline in the GDP of foreign countries, leading to a spurious correlation between the two variables. Second, although we have tried to be exhaustive in taking into account various factors, parsimony is also called for in our study. For example, we do not include the capital account in our model as in the empirical study by Kim and Ying (2007). Since current and capital accounts reflect each other, the inclusion of both variables will result in redundant information. Third, instead of using the nominal exchange rate, as Kim and Ying (2007) did, we choose to use the real exchange rate. This can be explained by the fact that, in the long run, nominal depreciations are estimated to lead to a proportional increase in prices that leaves the real exchange rate and economic activity unchanged, as the analysis based on the nominal exchange rate is usually limited to short-term effects (see Lizondo and Montiel 1989).

Moreover, a key element of the traditional conception of devaluation is that it is the improvement in the relative domestic price of tradable versus non-tradable goods, i.e. the depreciation of the real exchange rate that generates the process of expenditure transfer, balance of payments improvement, and economic expansion.

3.2 Identification of Structural Shocks by Imposing Sign Restrictions

Researchers in economics have discussed how to decompose forecast errors that are functions of orthogonal structural innovations, i.e. how to identify structural shocks to the variation of forecast errors at different horizons. Five methods are present in the literature, four of which are parametric restrictions. These parametric restrictions can vary depending on the individual set of parametric equations, the existence of a recursive causal structure (Sims 1988), and whether the shocks have known short- or long-term effects or a combination of both (Blanchard and Quah 1989). Each type has its own disadvantages and advantages.

For example, there is no clear consensus regarding the order of variables in the system of equations used to specify the VAR model, some orders may not be justified by the economic structure, and standard recursive identification assumptions may be superior in identifying restrictions that have developed over time in the same way as data mining, as researchers have sought restrictions that may yield reasonable results (see Rudebusch 1998).

The contemporary impact of zero may not be compatible with other classes of general equilibrium models (Canova and Pina 1999). In addition, Faust and Leeper (1997) showed that substantial biases in the estimates are possible due to small sampling biases and measurement errors when using zero restrictions in long-term effects.

Alternatively, the alternative proposed is to continue Uhlig's (2005) recent approach of restricting signs to identify exchange rate shocks using the median response calculated by Fry and Pagan (2011). The method of approach "Uhlig (2005)" is more appropriate here for some reasons. First, Uhlig used a different approach to identify structural shocks; they used the restriction of signs. The idea of this approach is to constrain the direction of the response functions due to a specific shock so that they are based on economic theory. Second, this approach is less restrictive than the recursive approach. However, it can lead to biased estimates when the signs of the response functions are misidentified.

This approach thus allows for greater freedom in the definition of identifying shocks, such as the combination of restrictions on the timing of impacts, on the signs, or the expected magnitude of the response of given variables to a single shock (see, e.g., Rafiq and Mallick 2008; Lian An 2006; Uhlig 2005).

Our main interest in this work is to obtain evidence on how exchange rate depreciation affects production in particular. Instead of identifying all structural disturbances, we use minimal restrictions that are

sufficient to identify the exchange rate depreciation shock and examine its effect on output. For this purpose, this work circumvents the “incredible” zero restrictions on the contemporaneous and long-run impact of shocks.

This is because the restrictions on signs do not impose any quantitative restrictions on responses, regardless of the definition of the variable used (see Rafiq and Mallick 2008). Moreover, compared to the traditional structural VAR model, the restrictions that are often used implicitly, in line with the conventional view, are made more explicit in the sign restriction approach. Granville and Mallick (2010) argued that the sign restriction method of response is robust to the non-stationarity of the series, including structural breaks. The advantage is that the identification of sign restrictions allows shocks to be identified using limited restrictions over multiple time series. Moreover, the sign restriction method does not limit impulse responses. A pure restriction approach explicitly uses restrictions that researchers implicitly use and are therefore agnostic (Rafiq and Mallick 2008).

Nevertheless, it is important to note that the constraints on the signs of shocks are not without criticism. For example, Fry and Pagan (2011) questioned the shocks identified and the optimal responses based on median criteria. Specifically, if only one shock is identified, i.e. exchange rate shocks, combinations of other shocks could resemble exchange rate shocks. One way to avoid this problem is to explicitly identify other shocks. According to Uhlig (2005), the problem of multiple shocks is not unique to the sign restriction method. For example, if the true data-producing mechanism has more shocks than variables, and if a classical Cholesky decomposition is used to identify an exchange rate shock by classifying it in last order, the shocks identified will in fact be a linear combination of several underlying shocks. In summary, this study does not claim that the identification hypotheses used are irrefutable or perfect, but rather that they are particularly reasonable, minimal, and well-crafted.

Fry and Pagan (2011) pointed out that the optimal response, using median criteria for different shocks and horizons, can combine information from several identification schemes and is therefore a composite of different structural response functions. They proposed an alternative method to overcome this problem by choosing a response as close as possible to the median while requiring that responses be generated from a single identification matrix, called the below median target method. This is why we use both methods at the same time: Uhlig's (2005) method to determine the exchange rate; and Fry and Pagan's (2011) method to calculate the median response. We call this the Uhlig–Fry–Pagan method.

In what follows, we provide a brief overview of the method used. The detailed methodology can be found in Uhlig (2005). Let a vector of n endogenous variables containing time- t values whose dynamic relationships are described by the following order auto-regression vector (VAR(k)):

$$Y_t = B_{(1)}Y_{t-1} + B_{(2)}Y_{t-2} + \dots + B_{(k)}Y_{t-k} + v_t, \quad t=1, \dots, T \quad (2)$$

where $B_{(k)}$ are matrices of coefficients of size $n \times n$ and v_t is the one-step prediction error with the variance-covariance matrix $\sum W_t$; let $n \times 1$ be a vector containing the time values of the structural perturbations. The reduced-form residuals and the structural perturbations are related by:

$$v_t = AW_t \quad (3)$$

where it is assumed that the structural perturbations are mutually independent and normalized to be of variance 1. It can therefore be written as follows: $E[W_t W_t'] = I$.

In addition, the j -th column of A (or its negative value) represents the immediate impact on all variables of the j -th structural innovation (shock) of a standard error. The only restriction on A so far that emerges from the covariance structure is:

$$AA' = \sum. \quad (4)$$

The problem of identification amounts to discovering $n(n-1)/2$ free elements in matrix A by imposing identification restrictions. According to Uhlig (2005), matrix A can always be written as follows:

$$A = X \Lambda Q \quad (5)$$

Where X is an orthogonal matrix, whose columns are the ortho-normal eigenvectors of \sum , Λ represents a diagonal matrix with the eigenvalues of \sum on its main diagonal, and Q represents an orthogonal matrix (i.e. $QQ' = I$).

Equation (5) shows that the choice of elements in an orthonormal set can determine the elements whose coordinates are free of A . Since we are only interested in the responses (reactions) to a particular shock, the exchange rate shock, the problem is to determine an orthonormal vector q in the following equation:

$$c = X \Lambda^{1/2} q. \quad (6)$$

Where c is a column of A , called the impulse vector by Uhlig (2005), containing the contemporaneous responses of n endogenous variables to the exchange rate shock, and q is a column of Q at the corresponding location. The main idea of the identification scheme is to impose a set of inequality constraints. This not only identifies the c , but also supports diversities of possible responses consistent with the sign restrictions.

In addition, we describe here how we explore the space of orthogonal decompositions. It is well known that, if we exclude the case of recursive models, the set of possible identifications is innumerable and it is difficult to search for them efficiently. The algorithm we use follows Canova and de Nicol (2002); we consider that for any orthogonal decomposition of A , we can find an infinite number of possible orthogonal decompositions Σ , such as $\Sigma = AQQ'A'$, where Q is any ortho-normal matrix ($QQ' = I$).

A Choleski decomposition, for example, would assume a recursive structure on A so that A is a lower triangular matrix. Another candidate for A is the decomposition of eigenvalues and eigenvectors, $\Sigma = X \Lambda X' = AA'$, and, following Canova and de Nicol (2002), we consider that:

$$X = \prod_{n=1}^{N-1} \prod_{m=n+1}^N Q_{m,n}(\theta)$$

where $Q_{m,n}(\theta)$ is an ortho-normal rotation matrix of the form:

$$Q_{m,n} = \begin{bmatrix} 1 & 0 & \dots & 0 & 0 \\ 0 & \cos(\theta) & \dots & -\sin(\theta) & 0 \\ \dots & \dots & 1 & \dots & \dots \\ 0 & \sin(\theta) & \dots & \cos(\theta) & 0 \\ 0 & 0 & \dots & 0 & 1 \end{bmatrix}$$

Where $0 < \theta \leq \frac{\pi}{2}$ and the indices (m,n) indicate that the rows m and n rotate at an angle θ .

To translate this result into an algorithm that looks for the space of orthogonal decompositions, first note that in a system of N variables there are $(N(N-1)/2)$ bivariate rotations and $(N(N-1)/4)$ combinations of bivariate rotations of different elements of the VAR, for a fixed θ . Thus, for $N=5$, there are 15 possible rotation matrices. Second, since $Q_{m,n}(\theta)$ is ortho-normal:

$$\Sigma = A Q_{m,n}(\theta) Q_{m,n}(\theta)' A' = X \Lambda^{0.5} Q_{m,n}(\theta) Q_{m,n}(\theta)' \Lambda^{0.5} X'$$

is a permissible decomposition.

Thus, based on an eigenvalue–eigenvector decomposition, it can be “multiplied” tenfold in one direction or the other, for each θ .

Third, we quadrant the interval $(0, \pi/2)$ into M points, and construct $15M$ orthogonal decompositions of Σ . This last step transforms an incalculable number into a large but finite search. Furthermore, we consider that $R_{j,t+k}$ is the matrix of impulse responses at horizon k . In order to identify the interesting q shock, sign restrictions can be imposed on $X \leq n$ variables on the horizon $0, \dots, K$.

The sign restrictions are imposed according to Uhlig's (2005) open economy model, as summarized below for the time horizon $k=0, \dots, K$. Details on the number of periods for which the restrictions apply are given below.

To identify an exchange rate shock, we impose the following restrictions:

$$R_{j,t+k}^{CPI} \geq 0, \quad k=0, \dots, 4$$

$$R_{j,t+k}^{TCR} \geq 0, \quad k=0, 1$$

$$R_{j,t+k}^{Re al M2} \leq 0, \quad k=0, \dots, 4$$

Consequently:

By definition, the exchange rate will not decline (≥ 0) in response to its own positive shock.

The price level does not fall (≥ 0) in response to a positive exchange rate shock, *i.e.* a depreciation of the exchange rate, because the price level is likely to be pushed up by an increase in net exports due to the depreciation of the exchange rate (for further discussion, see Ahmed *et al.* 2002). In general, the depreciation of the exchange rate should theoretically generate inflationary pressures, especially in a small open economy such as that of Morocco, through its effects on demand and supply. The latter effect flows through a channel of imported inputs: the depreciation increases inflation by leading to an increase in production costs. The first effect comes from the channel of expenditure transfers: depreciation stimulates aggregate demand by

increasing the demand for goods and services through net exports. The increase in aggregate demand can lead to higher input prices and nominal wages, *i.e.* inflation.

The real money supply does not increase (≤ 0) in the face of exchange rate depreciation for two reasons. First, when the price level rises in response to exchange rate depreciation, the real money supply declines. Second, as the exchange rate depreciates, central banks will tend to reduce the money supply to support the currency. For example, Rogers and Wang (1995), among others, empirically demonstrated that a depreciation of the real exchange rate leads to a significant reduction in the money supply.

The nominal interest rate will be considered positive (≥ 0) in the face of the depreciation of the domestic currency through its effect on inflation. As inflation increases, the real money supply decreases and thus nominal interest rates increase. Generally, depreciation improves the trade balance through expenditure transfers and expenditure reduction effects. The former effect shifts demand towards domestically produced goods, while the latter reduces domestic consumption due to the effect of real cash balances and higher interest rates.

These restrictions seem reasonable, as they appeal only to a priori attractive and consensual views on the effects of the exchange rate shock on prices, the exchange rate, and the money supply. Since the output response is the focus of this study, we leave it to the data to determine this, without imposing restrictions on the possible outcome. The current account is not restricted because it reflects the response of the trade balance to the exchange rate. Therefore, the method remains agnostic with respect to the responses of key interest variables.

Therefore, for each set of estimates (B, Σ) , impulse vectors and thus impulse response functions corresponding to different unit vectors in an n -dimensional sphere can be calculated. We generate n numbers from a normal distribution with a mean of zero and a standard deviation of 1, treat them as coordinates, and normalize the resulting vector to a unit vector. The normalized n -dimensional vector corresponds to each point of the sphere. We can repeatedly generate n -dimensional vectors to cover the sphere uniformly.

The sampling uncertainty of the VAR parameters (B, Σ) is covered in a Bayesian manner. According to Uhlig (2005), we assume that the anterior and posterior distributions for (B, Σ) belong to the Normal–Wishart family. We simulate 500 pairs of (B, Σ) . For each pair, we evaluate 500-unit vectors on the n -dimensional sphere. Thus, a total of 250,000 q and impulse vectors are evaluated. After calculating each set of impulse response functions corresponding to each unit vector, we check whether the sign restrictions are met. Only those impulse vectors that meet the restrictions used are stored.

4. Results and Discussion

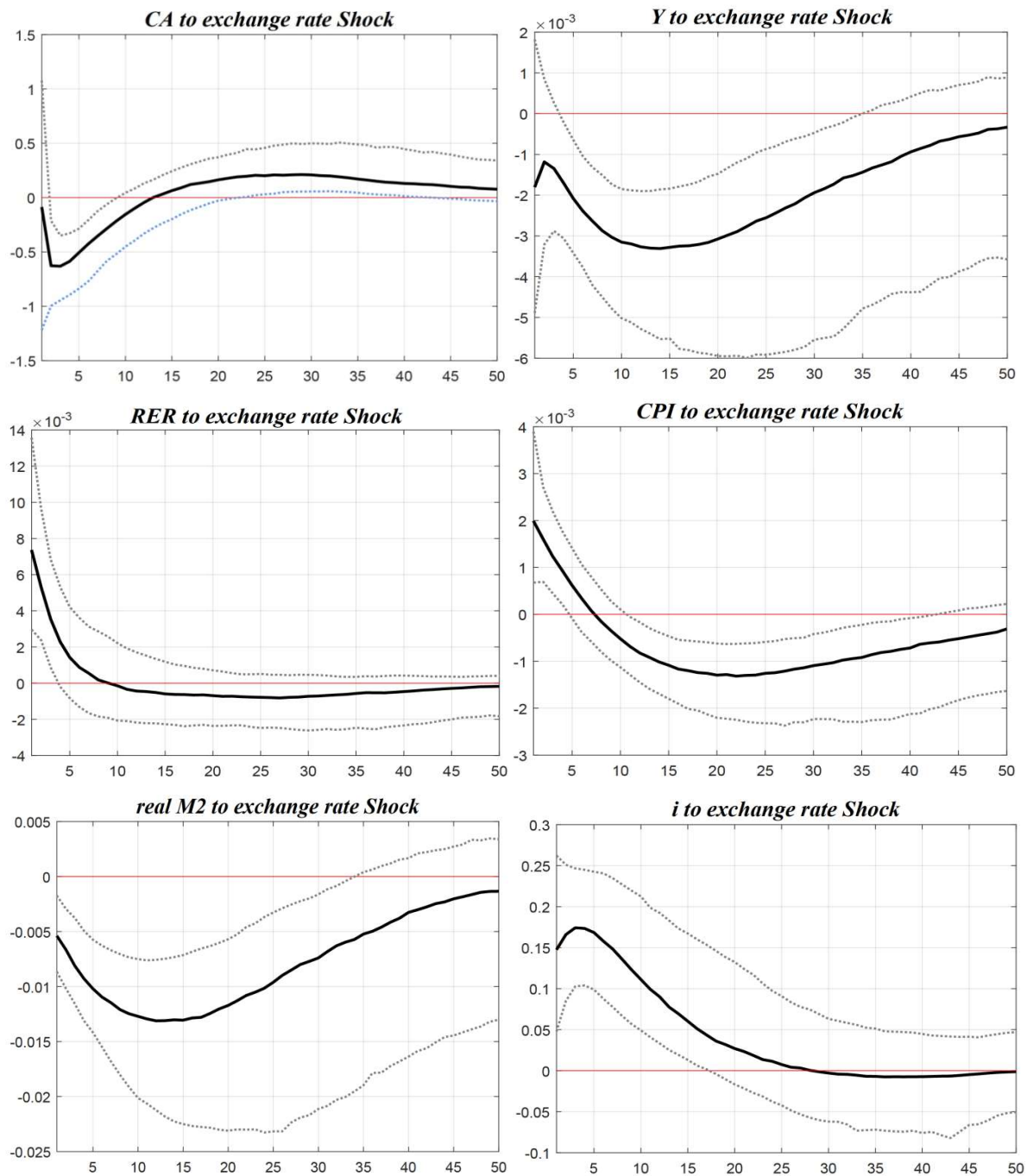
Figure 2 shows the impulse responses of each of the six variables (at a change of one standard deviation) to the positive exchange rate shock (indicating a depreciation) over a 50-quarter period. Responses are below the median target in each graph in Figure 2 and are represented by quintiles of 16% and 84%.

As shown in Figure 2, it is interesting to note that the current account shows the phenomenon known as the “J-curve,” *i.e.* in response to exchange rate depreciation, the current account first deteriorates, marginally significantly, before improving and finally reaching long-term equilibrium (Bahmani-Oskooee and Ratha 2004; Bahmani-Oskooee and Hegerty 2010; Bahmani Oskooee *et al.* 2013). The J-curve highlights the fact that the positive effects (volume effects) do not come into play immediately, whereas the negative effects (price effects) come into play immediately: this curve is therefore based on a time horizon (in our case, quarterly).

The question that now arises is whether the improvement in the current account, after exchange rate depreciation, implies an unambiguous expansion of output. The answer is shown to be not necessarily. It should be noted that the current account generally improves and output deteriorates in response to exchange rate depreciation.

Diaz-Alejandro (1963) pointed out that an observer of depreciation might be surprised to see that depreciations have led to an improvement in the trade balance, accompanied by a decline in the level of total production. Kim and Ying (2007) revealed similar findings. This is not an odd result. First, the observed improvement in the current account balance may not be the result of a boom in exports, but of a deep contraction in imports resulting from the contraction in production (see Frankel, 2005). Second, the restrictive effect of exchange rate depreciation may offset the expansionary effect on the trade balance, leading to a decline in aggregate output.

Figure 2. The impulse responses of different interest variables to an exchange rate shock.



Source: Authors' calculations.

Note: X-axis denotes quarters; vertical axis denotes percentage. We assume that the anterior and posterior distributions for (B, Σ) belong to the Normal-Wishart family. We simulate 500 pairs of (B, Σ) . For each pair, we evaluate 500 unit vectors on the six-dimensional sphere. Thus, a total of 250,000 q and impulse vectors are evaluated.

The structuralist view argues that devaluation has contractionary effects on production. It is also in line with the priorities of a recent study by An, Kim and Ren (2014) that showed that devaluation by contraction can occur both in developed and developing countries on the basis of data from 16 countries in three groups: Latin American countries; Asian countries; and non-G3 developed countries (see also Kandil 2013; Kim *et al.* 2007). Similarly, contractionary devaluation could exist in any exchange rate regime, be it a floating exchange rate regime, a fixed exchange rate regime, or a common currency area. Therefore, devaluation through contractionary may not be a function of exchange rate regimes or types of economies. Ahmed *et al.* (2002)

reported that devaluation leads to greater economic contraction in developing countries than in developed countries.

Generally, the reaction of monetary policy variables, including the interest rate (i) and the real money supply (real M2) to the exchange rate shock, in fact reflects the reaction of the monetary authorities to this type of shock. The third row, under column 2 of the graphs in Figure 2, reveals that interest rate (i) reacts positively, almost immediately, to an exchange rate shock, indicating that Moroccan monetary policy is not neutral in the face of an exchange rate shock and that the central bank plays its role as a macroeconomic actor.

In addition, in the first column of row 3 of the graphs in Figure 2, the real money supply declines in response to an exchange rate shock, indicating the central bank's efforts to control inflation. These results clearly show that the monetary policy authorities act by raising rates to mitigate the negative effects of depreciation on inflation and economic activity. Bjornland and Halvorsen (2014) reached similar conclusions for six open economies (Australia, Canada, New Zealand, Norway, Sweden, and the UK). Their results revealed that central banks respond immediately to exchange rate depreciation and thus reduce the negative effects of depreciation on output and inflation.

This finding is theoretically consistent with Svensson's (2000) view that, in the real world, inflation-targeting economies are generally very open economies where capital can move freely. Therefore, shocks from the rest of the world are essential, and the exchange rate plays a significant role in the transmission of monetary policy in these economies.

Aiming to take better account of external shocks that affect countries and their exchange rates, Svensson (2000) extended the formal analysis of closed-economy inflation targeting to a small open economy where the exchange rate and shocks from the rest of the world are important for formulating monetary policy. He argued that including the exchange rate in the analysis of the inflation-targeting regime has important consequences. First, the exchange rate provides an additional channel for the transmission of monetary policy. Second, the exchange rate (as an asset price) is a forward-looking variable, the value of which is determined by expectations. It therefore contributes to better forward-looking decision-making and strengthens the role of expectations in monetary policy. Third, some foreign shocks are transmitted to the domestic economy through the exchange rate (i.e. foreign inflation, foreign interest rates, and foreign investors' exchange risk premiums). Therefore, when developing a small open economy model with an inflation-targeting regime, it is important to place particular emphasis on exchange rate channels in monetary policy.

Overall, our results show that there has been a deep recession and high inflation in the Moroccan economy following the depreciation of the dirham. In other words, the depreciation has created serious deflationary effects. Our results suggest that the monetary authorities reacted immediately to the exchange rate shocks by raising their interest rate. However, these measures seem to have had a limited impact on mitigating the deflationary effects. The challenge for monetary authorities is therefore to act preventively to avoid the economy falling into deflation.

This can be explained by the fact that the exchange rate shock has the main effect of passing through the supply channels, in particular the cost of imported inputs, due to Morocco's strong dependence on inputs imported from the euro zone especially. In this sense, structural reforms aimed at reducing this dependence can help to mitigate the negative effects of currency depreciation on macroeconomic performance. Finally, our findings clearly show that the exchange rate shock is transmitted mainly to economic activity and inflation through import variations.

Table 3. Variance decomposition of interest variables due to exchange rate shocks

	RER	Y	RealM2	CPI	CA	i
1	0.27	0.18	0.03	0.004	0.006	0.51
2	0.55	0.23	0.10	0.02	0.10	0.004
3	0.49	0.18	0.19	0.04	0.10	0.002
4	0.46	0.17	0.22	0.04	0.10	0.002
5-long-terme	0.45	0.16	0.23	0.05	0.10	0.002

Source: Authors' calculations.

Notes: RER=real exchange rate (EERI); CPI=inflation; RealM2=real money supply; i=interest rate; CA=current account; Y=output.

This is consistent with Morocco's heavy dependence on imports and with the findings of Kandil's (2015) study, which examined how exchange rate fluctuations are transmitted to the real economy in developed and developing countries.

While impulse response functions reveal the dynamic effects of a one-off shock, variance decompositions are a practical measure of the importance of such shocks in the system. Table 3 shows the proportion of fluctuations in the current account, output, real exchange rate, inflation, money supply, and interest rate attributable to exchange rate shocks at horizons of 0, 4, 8 and 12 quarters.

Exchange rate shocks account for between 0.6% and 10% of the change in the current account and between 16% and 23% of the change in real output. After the real exchange rate variable, exchange rate shocks are the most important factors of output and account for over 18% of the variance of output.

In summary, two key conclusions can be drawn:

1. In times of real depreciation, whether output increases or not has little to do with the improvement in the current account.

2. Morocco is fairly homogeneous in that the current account generally improves while output declines, which is consistent with the uniform negative correlations between the real exchange rate and output with negative lags.

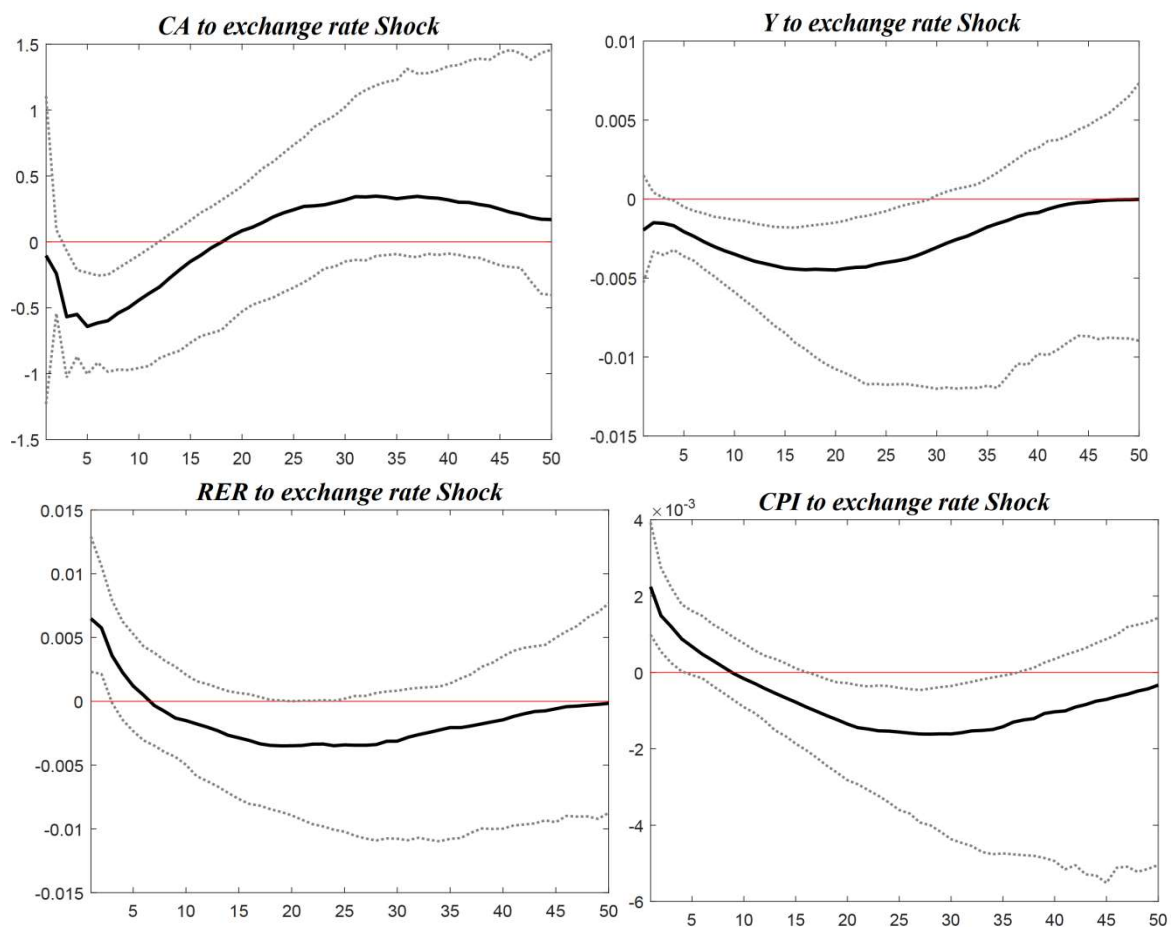
5. Robustness Check: Estimation of Alternative Models

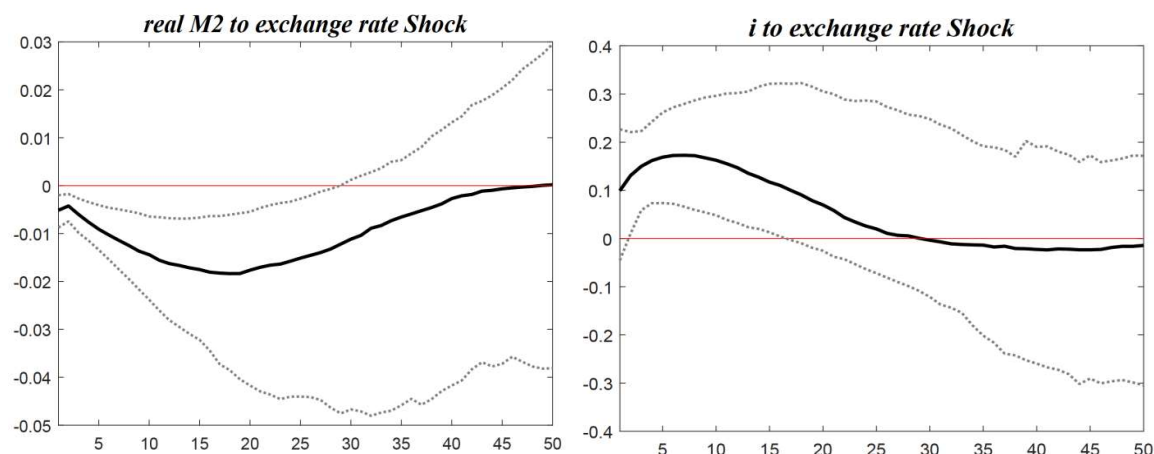
Empirical results often depend on modeling assumptions and variable definitions. Thus, in this section, we estimate different VAR model specifications and also use other variable definitions to assess the robustness of our results.

5.1. Alternative Measurement of the Exchange Rate

We test the sensitivity of the results by using the variable of the bilateral real exchange rate of the dirham vis-à-vis the euro zone instead of the real effective exchange rate.

Figure 1. Impulse responses of different interest variables to an exchange rate shock.





The Moroccan economy is heavily dependent on European Union (EU) countries for its exports, tourism revenues, remittances, and FDI flows. In addition, the economic proximity of the country with Europe explains the sensitivity of Morocco to various exogenous shocks. This makes Morocco potentially vulnerable to fluctuations in EU growth, and in particular to the unprecedented recession recently experienced by EU economies. Similarly, according to the IMF, the trade balance has been structurally in deficit over the period 1990–2017. Further, Morocco's productive base remains relatively weak relative to its full potential and the country remains partly vulnerable to exogenous macroeconomic shocks.

The crucial point here, in the extended model, when using the bilateral real exchange rate, is that the depreciation only has an effect in the long run (almost 17 quarters compared to the basic model in which the current account adjustment does not exceed eight quarters). Thus, the trade balance has evolved in the form of "J." It is evident that it is preferable to choose to study the effective exchange rate instead of using the bilateral exchange rate. In this context, the effective exchange rate provides a better indicator of the macroeconomic effects of exchange rates than bilateral rate. This is because the real effective exchange rate is adjusted for some measures of relative prices or costs; changes in the real effective exchange rate therefore take into account both changes in the nominal exchange rate and the inflation differential vis-à-vis trading partners. In both monetary policy and market analysis, the advantage is that it serves a variety of purposes: as a measure of international competitiveness; as a component of monetary and financial conditions indices; as an indicator of the transmission of external shocks; and as an intermediate objective of monetary policy. For the other variables of interest, the results are similar to those of the basic model (see Figure 3).

Conclusion

In this article, the effects of real exchange rate changes on real output have been analyzed by using quarterly data from 1995Q1 to 2019Q1. This is the first time such a study has been undertaken on the depreciation of the Moroccan dirham, and we have presented empirical results obtained using a VAR model with sign restrictions. We have established this type of model for a small subset of variables allowing the identification of the exchange rate shock. It is important to note that the current account exhibits the phenomenon known as the "J-curve," *i.e.* in response to the exchange rate depreciation, the current account initially deteriorates marginally (statistically) significant, then improves and finally reaches long-term equilibrium (Bahmani-Oskooee and Ratha, 2004; Bahmani-Oskooee and Hegerty, 2010; Bahmani Oskooee et al., 2013). Overall, our results show that there has been a deep recession and high inflation in the Moroccan economy following the depreciation of the dirham. Our results suggest that the monetary authorities reacted immediately to the exchange rate shocks by raising their interest rate. However, these measures appear to have had a limited impact on mitigating the deflationary effects. The challenge for the monetary authorities is therefore to act preventively in order to prevent the economy from falling into deflation. In summary, two key conclusions emerge: in times of real depreciation, whether output increases or not has little to do with the improvement in the current account; and Morocco is fairly homogeneous in that the current account balance generally improves while output declines, which is consistent with the consistent negative correlations between the real exchange rate and output with negative lags.

References

- [1] Armington, P. S. 1969. A Theory of Demand for Products Distinguished by Place of Production (Une Théorie de La Demande de Produits Différenciés d'après Leur Origine) (Una Teoría de La Demanda de Productos Distinguiéndolos Según El Lugar de Producción). *Staff Papers (International Monetary Fund)*, 16(1): 159–78. DOI: <https://doi.org/10.2307/3866403>
- [2] Bahmani-Oskooee, Mohsen, and Abera Gelan. 2013. Are Devaluations Contractionary in Africa?" *Global Economic Review*, 42(1): 1–14. DOI: <https://doi.org/10.1080/1226508X.2013.769798>
- [3] Bahmani-Oskooee, Mohsen, and Artatrana Ratha. 2004. The J-Curve: A Literature Review. *Applied Economics*, 36(13): 1377–98. DOI: <https://doi.org/10.1080/0003684042000201794>
- [4] Bahmani-Oskooee, Mohsen, and Kandil, M. 2009. Are Devaluations Contractionary in MENA Countries? *Applied Economics*, 41(2): 139–50. DOI: <https://doi.org/10.1080/00036840600994195>
- [5] Bjørnland, H.C., and Halvorsen, J. I. 2014. How Does Monetary Policy Respond to Exchange Rate Movements? New International Evidence*. *Oxford Bulletin of Economics and Statistics*, 76(2): 208–32. DOI: <https://doi.org/10.1111/obes.12014>
- [6] Blanchard, O.J., and Quah, D. 1989. The Dynamic Effects of Aggregate Demand and Supply Disturbances. *The American Economic Review*, 79(4): 655–73. DOI: <http://www.jstor.org/stable/1827924>
- [7] Boyer, R. S. 1978. Optimal Foreign Exchange Market Intervention. *Journal of Political Economy*, 86(6): 1045–1055. DOI: <https://www.journals.uchicago.edu/doi/abs/10.1086/260727>
- [8] Canova, F., and Pires Pina, J. 2000. Monetary Policy Misspecification in VAR Models. SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, August 9, 2000. DOI:<https://doi.org/10.2139/ssrn.224529>
- [9] Cooper, R.N. 1969. Currency Devaluation in Developing Countries: A Cross- Sectional Assessment. *Discussion Papers*, July 1, 1969. Available at: <https://elischolar.library.yale.edu/egcenter-discussion-paper-series/80>
- [10] Díaz, A.C.F. 1963. A Note on the Impact of Devaluation and the Redistributive Effect. *Journal of Political Economy*, 71(6): 577–80. DOI: <http://www.jstor.org/stable/1828441>
- [11] Faust, J., and Leeper, E. M. 1997. When Do Long-Run Identifying Restrictions Give Reliable Results? *Journal of Business & Economic Statistics*, 15(3): 345–53. DOI: <https://doi.org/10.2307/1392338>
- [12] Frankel, J. A. 2005. Mundell-Fleming Lecture: Contractionary Currency Crashes in Developing Countries in: IMF Staff Papers Volume 2005 Issue 002. Available at: <https://www.elibrary.imf.org/view/journals/024/2005/002/article-A001-en.xml>
- [13] Fry, R., and Pagan, A. 2011. Sign Restrictions in Structural Vector Autoregressions: A Critical Review. *Journal of Economic Literature*, 49(4): 938–60. DOI: <http://www.jstor.org/stable/23071662>
- [14] Granville, B., and Mallick, S. 2010. Monetary Policy in Russia: Identifying Exchange Rate Shocks. *Economic Modelling*, 27(1): 432–44. DOI: <https://doi.org/10.1016/j.econmod.2009.10.010>
- [15] Gylfason, T., and Schmid, M. 1983. Does Devaluation Cause Stagflation? *The Canadian Journal of Economics / Revue Canadienne d'Economie*, 16(4): 641–54. DOI: <https://doi.org/10.2307/135045>
- [16] Kamin, S. B., and Rogers, J. H. 2000. Output and the Real Exchange Rate in Developing Countries: An Application to Mexico. *Journal of Development Economics*, 61(1): 85–109. Available at: https://econpapers.repec.org/article/eedeveco/v_3a61_3ay_3a2000_3ai_3a1_3ap_3a85-109.htm
- [17] Kandil, M. 2015. The Adverse Effects of Real Exchange Rate Variability in Latin America and the Caribbean. *Journal of Applied Economics*, 18(1): 99–120. DOI: [https://doi.org/10.1016/S1514-0326\(15\)30005-2](https://doi.org/10.1016/S1514-0326(15)30005-2)
- [18] Karahan, Ö. 2020. Influence of Exchange Rate on the Economic Growth in the Turkish Economy. *Financial Assets and Investing*, 11(1): 21–34. DOI: <https://doi.org/10.5817/FAI2020-1-2>

- [19] Kim, Y., and Yung Hsiang Ying. 2007. An Empirical Assessment of Currency Devaluation in East Asian Countries. *Journal of International Money and Finance*, 26(2): 265–83. DOI:<https://doi.org/10.1016/j.jimonfin.2006.11.004>
- [20] Krugman, P., and Taylor, L. 1978. Contractionary Effects of Devaluation. *Journal of International Economics*, 8(3): 445–56. DOI: [https://doi.org/10.1016/0022-1996\(78\)90007-7](https://doi.org/10.1016/0022-1996(78)90007-7)
- [21] Krugman, P.R, Obstfeld, M. and Melitz, M.J. 2018. *International Economics: Theory & Policy*, 2018. Available at: <https://www.pearson.com/us/higher-education/program/Krugman-International-Economics-Theory-and-Policy-RENTAL-EDITION-11th-Edition/PGM1838559.html>
- [22] Lian, A., Gil Kim, and Xiaomei Ren. 2014. Is Devaluation Expansionary or Contractionary: Evidence Based on Vector Autoregression with Sign Restrictions. *Journal of Asian Economics*, 34: 27–41. DOI:<https://doi.org/10.1016/j.asieco.2014.03.003>
- [23] Lizondo, J. S., and Montiel, P. J. 1989. Contractionary Devaluation in Developing Countries: An Analytical Overview. *Staff Papers (International Monetary Fund)*, 36(1): 182–227. DOI:<https://doi.org/10.2307/3867174>
- [24] Mejía-Reyes, P., Osborn, D. R. and Sensier, M. 2010. Modelling Real Exchange Rate Effects on Output Performance in Latin America. *Applied Economics*, 42(19): 2491–2503. DOI:<https://doi.org/10.1080/00036840701858117>
- [25] Mohsin S. K. and Choudhri, E. U. 2004. Real Exchange Rates In Developing Countries: Are Balassa-Samuelson Effects Present? *IMF Working Papers*, 2004(188). Available at: <https://www.elibrary.imf.org/view/journals/001/2004/188/001.2004.issue-188-en.xml>
- [26] Mountford, A., and Uhlig, H. 2009. What Are the Effects of Fiscal Policy Shocks? *Journal of Applied Econometrics*, 24(6): 960–92. DOI: <https://doi.org/10.1002/jae.1079>
- [27] Mundell, R. A. 1963. Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates. *The Canadian Journal of Economics and Political Science / Revue Canadienne d'Economie et de Science Politique* 29(4): 475–85. DOI: <https://doi.org/10.2307/139336>
- [28] Peersman, G. 2005. What Caused the Early Millennium Slowdown? Evidence Based on Vector Autoregressions. *Journal of Applied Econometrics*, 20(2): 185–207. DOI: <https://doi.org/10.1002/jae.832>
- [29] Rafiq, M. S., and Mallick, S. K. 2008. The Effect of Monetary Policy on Output in EMU3: A Sign Restriction Approach. *Journal of Macroeconomics* 30(4): 1756–91. DOI: <https://doi.org/10.1016/j.jmacro.2007.12.003>
- [30] Rudebusch, G. D. 1998. Do Measures of Monetary Policy in a Var Make Sense? *International Economic Review* 39(4): 907–31. DOI: <https://doi.org/10.2307/2527344>
- [31] Shaghil, A. et al. 2002. Are Depreciations as Contractionary as Devaluations? A Comparison of Selected Emerging and Industrial Economies. SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, September 1, 2002. DOI: <https://doi.org/10.2139/ssrn.333403>
- [32] Sims, C.A. 1988. Bayesian Skepticism on Unit Root Econometrics. *Journal of Economic Dynamics and Control*, 12(2): 463–74. DOI: [https://doi.org/10.1016/0165-1889\(88\)90050-4](https://doi.org/10.1016/0165-1889(88)90050-4)
- [33] Svensson, Torsten. 2000. Reviews. *Economic and Industrial Democracy* 21(2): 269–71. DOI:<https://doi.org/10.1177/0143831X00212009>
- [34] Turner, P., and Van 't Dack, J. 1993. Measuring International Price and Cost Competitiveness. BIS Economic Papers, 39. DOI: <https://www.bis.org/publ/econ39.htm>
- [35] Uhlig, H. 2005. What Are the Effects of Monetary Policy on Output? Results from an Agnostic Identification Procedure. *Journal of Monetary Economics*, 52(2): 381–419. DOI:<https://doi.org/10.1016/j.jmoneco.2004.05.007>



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NEXUS BETWEEN FISCAL DISCIPLINE AND THE BUDGET PROCESS IN AFRICA: EVIDENCE FROM NIGERIA

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Abstract:

This paper examined the nexus between fiscal discipline and the budget process in Nigeria over the period from 1990 to 2020. Findings showed that the level of fiscal discipline in Nigeria as measured by two proxies of fiscal deficit gap and public debt gap is more enhanced under zero-based budgeting than under current incremental budgeting system. The study also established that civilian administrations are more prone to fiscal indiscipline relative to military dispensations. The paper also revealed the significant role of net foreign aid receipts in significantly narrowing fiscal deficit and public debt gaps in the short-run and long-run, respectively, as well as noted the significant widening impact of an increasing government size on the public debt gap in the long run. The study recommends, among others, the urgent need for the Nigerian government to restore fiscal discipline in public affairs through a reversion to zero-based budgeting system.

Keywords: fiscal discipline; fiscal responsibility act; debt threshold; zero-based budgeting; incremental budgeting; ARDL; Nigeria.

JEL Classification: C32; C53; H61; H68.

1. Introduction

1.1 Background to the Study and Problem Statement

Deficit bias, unsustainable debt, and a dreadful condition of budget process have enslaved the fiscal structure of various countries, including Nigeria, during the last three decades, thereby necessitating implementing a more effective resources management plan. Nigerians and the government face numerous obstacles as a result of the nation's building process. In the assertion of Sunday (2016), to strengthen the mechanics of governance, the Nigerian government has embarked on several fiscal reforms, ranging from the 2010 Monetization Policy, the 2007 Fiscal Responsibility Act with a GDP of 3%, the Treasury Single Account (TSA) to mention but few. With all sense of fairness, the core objective of these reforms are however yet to be realized till date. This problem of gross fiscal indiscipline is never a Nigerian problem. For instance, in most OECD countries, high and rising public debts and substantial and chronic government deficits are sources of concern to many. Deficits and debt levels in some of these countries at the detriment of currency and overall macroeconomic stability. The government's ability to meet more critical social needs has been hampered by debt servicing responsibilities (Jurgen von Hagen *et al.* 1996).

Every government faces budget constraints, which necessitates fiscal discipline. These constraints are about long-term governmental debt, not only short-term fiscal deficits. It is not even about the debt's magnitude in a given year; it is also about how it changes over time. Financial discipline is consistent with a significant debt that is on its way down, but not with a debt that continues to clinch upwards. In the specific case of Nigeria, the country's fiscal space is constrained by factors including but not limited to: dwindling of foreign exchange rates and oil export earnings; free fall of external reserves, and the annual budget usually tied to global oil revenue benchmarks in terms of global oil pricing and domestic production. In a bid to instill fiscal discipline, the Nigerian government enacted that Fiscal Responsibility Act (FRA, subsequently) which stipulates that fiscal deficit is maintained at 3% of GDP per annum. The FRA provides for effective budgeting and budgetary control, effective revenue sourcing and generation, debt management, and expenditure control, emphasizing the need for prudence, transparency, and accountability as cornerstones of responsible accounting (Olehinwa and James 2012). According to Olurankinse (2012), the budget in the public sector of Nigeria has almost become an annual ritual with good content but without noticeable results. Olaoye (2014) asserted that legislative barriers in the Nigerian budget process are emerging challenges causing budgeting failure in Nigeria. The author noted the abuse by the legislature to include: tempering with benchmarks, victimization, the inclusion of foreign projects and delayed budget passage. To this end, it is considered imperative that a study is conducted to investigate the key determinants of fiscal discipline in Nigeria. This is actually the main thrust of the present study.

1.3 Research Questions

In light of the issues above, this study seeks to proffer answers to the following questions:

1. Does Nigeria instill fiscal discipline in public affairs?
2. What is the impact of the budget process on fiscal discipline in Nigeria?
3. What other factors that significantly explain the level of fiscal discipline in Nigeria?

1.4 Research Objectives

The broad objective of this study is to examine the nexus between fiscal discipline and the budget process in Africa with special reference to Nigeria. However, the specific objectives are to:

1. determine if Nigeria instills fiscal discipline in public affairs.
2. estimate the impact of the budget process on fiscal discipline in Nigeria.
3. determine other factors driving the level of fiscal discipline in Nigeria.

1.5 Significance of the Study

Seemingly, budgets should be handled within clear, credible and predictable fiscal policy boundaries, and that budgets should tightly associate with the government's medium-term strategic aims, and budget documents and data should be opened, transparent and accessible. With this in mind, this paper offers evidence-based approach to suggesting useful ways to instill and enhance fiscal discipline and financial transparency in public affairs.

1.6 Plan of the Study

Following the introduction section, the rest of the paper proceeds as follows. Section 2 contains the materials and methods with sub-sections including a review of relevant concepts, theories and empirics, theoretical framework, empirical model specification, estimation procedure, and data description and sources. Section 3 entails the results and discussion with sub-sections including preliminary analysis (graphical representation, descriptive statistics, the results of unit root and cointegration tests), as well as, the discussion of regression estimates and post-estimation test results. Section 4 concludes the paper.

2. Materials and Methods

2.1 Conceptual Review: Fiscal Discipline and Budgeting Process

Fiscal discipline can be defined as the standpoint that allows for the government to maintain fiscal positions that do not create macroeconomic imbalances and supports stability and economic growth (Hemming, Kell and Mahfouz 2002). Given this, the government must avoid the accumulation of debts and indiscriminate utilization of funds meant for designated institutions or projects. Rubin (2007) defines the breakdown of fiscal discipline in terms of political, process and institutional components of public budgeting at different levels of government. Political unwillingness causes delay and an inability to reach consensus. Process problems include hidden spending (black budgets and off-budget) and re-budgeting schemes. Institutional problems include an inability to meet resolution deadlines and inappropriate use of supplemental appropriations. The crux of fiscal discipline rests on the central governmental financial activities, which in itself differs from budget discipline as both terms have been misconstrued to imply the same thing, as the latter is part of the former. Budget discipline considers both rules and sanction which further entails balanced budget rules, deficit ceiling, accounting and reporting requirements, instruments of budget administrative control (Dafflon 2012), while fiscal discipline encompasses budget discipline with planning, balancing and execution activities to sustain all government operations (Hou and Willoughby 2010).

On the other hand, budgeting relates to other governmental actions, and it is interrelated with many governmental concepts. A good budget reflects various pillars of public governance: integrity, openness, participation, accountability, and a strategic approach to planning and achieving national objectives. Budgeting constitutes a mutually binding trust between states and their citizens. The pattern of budgeting in Africa between 1970-1980, according to Gyimah-Brempong (1998), prioritized defense, education and economic initiatives while other projects were sidelined. The financial allocation process in Africa was best characterized in terms of political and social constraints exerted on policymakers by diverse interest groups. Advanced countries like the United States have seen budgeting shift from the conventional congressional debates and final policy statements to a closed stream of thought informed by the presidents and his advisors (Khan and Hildreth 2002).

A good budget reflects elements of excellent public government, which are integrity, openness, engagement, accountability and a strategic approach to planning and attaining national objectives. Oyeleke and Ajilore (2014) found that fiscal policy in Nigeria was weakly sustainable for the period 1980-2010, implying that the Nigerian budget has been placed outside the nation's constraint and solvency. Budget padding is another idea ingrained in the Nigerian budgeting process, and it has been identified as a crucial component in creating bloated and wasteful budgets (Theophilus and Perpetual 2016). Poor budget conceptualization, the inadequacy of implementation plans, non-release or late release of budgeted funds, a lack of budget performance monitoring, a lack of technical capacity among MDAs, and delays in budget passage and enactment are some of the challenges that have contributed to the poor performance in the Low budget of Nigeria (Kingsley and Ehigiamusoe 2014).

In addition, development and the expansion of populations and costs gave rise to planned spending to control fiscal balance. A Budget is a numerical plan for allocating resources to specific activities. It includes the money that will be spent and when it will be spent. Besides from expenses, a budget can also include income. Budgets are typically prepared for revenues (income or earnings), recurring expenditures, and large capital expenditures such as land, equipment, furniture. Budget estimates must be made for daily, weekly, or monthly activities and expenses and annual estimates (Ray 2020). It has been opined that lack of cost, time and knowledge are determinants of the budgeting process (Alles *et al.* 2021). Evidence-based budgeting has been earmarked as a means to budget allocation efficiency (Long *et al.* 2021).

2.2 Theoretical Review

2.2.1 Maximum Social Advantage

The use of an economic method to discover the component of government budgeting and expenditure is recommended in this approach. The government uses this strategy to spend its limited resources on alternative amenities, ensuring that the marginal benefit is equal across all products purchased. In other words, spending should be spread in such a way that the final monetary unit spent has the same level as the first. The basic premise of public finance is Dalton's concept of Maximum Social Advantage, which states that "economic welfare is achieved when the ensuing gains from marginal utility on expenditure equals the marginal dis-utility enforced by taxation". This elucidates the terrain of how the fiscal policy affects the nation's economic budget process. As a result of this, the government is only obligated to spend to the degree that the marginal social advantage of all spending equals the marginal social detriment of alternative measures of obtaining additional public revenue (see Periola 2019).

2.2.2 Public Choice Approach

Essentially, the government's role is to cater for its citizens and not their individual welfare. Public Choice Approach (PCA) is a collection of theories that acknowledge the importance of political process in forming popular choices. Duncan (1948) was the first to write on public choice, and his work was further expanded upon by the works of Buchanan and Gordon (1962); Buchanan (1967); Kenneth (1963). According to the PCA theory, government spending is dictated by self-interest rather than public interest in democratic countries. Governments manage their spending and earnings to increased their chances of winning their elections. As a result, planning the spending of a nation, is defined by series of discrete policy outcomes based on the assessment of votes losses and gains. Furthermore, special interest coalitions pressing the government for wealth transfers tends to raise the size of government authorized expenditure people are more likely to campaign for government, spending that benefits them, with concentrated interest triumphing over the dispensed common interest (see Periola 2019).

2.2.3 The Common Pool Resource (CPR) Problem

Fiscal indiscipline is deeply rooted in poor governance over the use of common pool resources (see Kontopoulos and Perotti 1999; von Hagen and Harden 1995; Weingast *et al.* 1981; Wyplosz and Kostrup 2010; and Hallerberg *et al.* 2009). The common pool resource problem is the consequence of rent-seeking behaviour of some industry players and the elite which comes in the form of tax rebates, subsidies; whereby, those enjoying the marginal benefits from additional public spending are not almost the same as those that bear the marginal cost of contributing to the common pool resource. If the beneficiaries of rent seeking are same as the cost bearers, they would have chosen the level of spending that ultimately equates the marginal benefit and marginal cost associated with the common pool resource use. But since this may not necessarily be the case most of the times, the beneficiaries tend to ask for more government spending and even favour widening budget deficits and public debt accumulation. This, therefore, reflects the fact that the beneficiaries of public spending fail to fully internalize the costs that taxpayers must assume in contributing to the nation's treasury – the common pool resource (see Periola 2019).

2.3 Empirical Review

Tapsoba *et al.* (2019) analyzed the role of African regional economic communities in the convergence of fiscal policies from 1990-2015. However, both the current and future determinants of the nation's fiscal discipline hinge on the socio-economic conditions in low-income countries, which then constitute the key determinants of fiscal discipline in these countries (see Fagbemi 2020). Moral persuasion has been found to benefit the budgetary framework in incentivizing a coordinated response through coordinating organizations. In a study involving more than 200 US cities, Moore (1980) concluded that budgeting formats are determined by each region's perception of budgeting problems. The budgeting types identified are line-item budgeting, reform budgeting, planning and programming budgeting. Gyimah-Brempong (1998) found that the budgeting pattern in Africa during the 1970s and 1980s prioritized defense, education and economic programs while other programs were marginalized. It was concluded that the budgetary allocation process in Africa could best be explained in terms of the political and social pressures invoked on policymakers by various interest groups. Advanced countries like the United States have seen budgeting shift from traditional congressional debates and definitive policy statements to a closed line of thought informed by the presidents and his aides (Khan and Hildreth 2002).

A large quantum of the literature has paid a quantum leap on the impact of declining/weak revenue and poor real GDP growth on developing countries' fiscal situation (Bevan 2010). It has also been noted that the depreciation of the Naira powers the growth of government expenditure over total revenue. This expands the budget deficit or can generate a budget deficit over time (Egwaikhide *et al.* 1994). The determinants of budget deficit are location-specific, and they are economic growth, debt, unemployment rates, GDP per capita, level of urbanization, climate variability, national account balances, inflation, aid, military spending, as well as political factors, and quality of budgetary institutions (Mawejje and Odhiambo 2020). The government's provision of public goods was significant to widening the fiscal deficits in Ivory Coast (Kouassy and Bohoun 1993). More recently, Ejiogu *et al.* (2020) explored the Nigerian government's budgetary response to the COVID-19 pandemic and found that increased borrowing to fund COVID-19 related economic and social interventions have significantly squeezed Nigeria's fiscal space, thus highlighting a budget with low resilience. It was also averred that while some interventions provided short-term economic relief, other interventions have potentially significant adverse effects on businesses and households.

There are pieces of evidence linking poor budget institutions and processes to the budget deficit in Zimbabwe. Adopting the fiscal illusion theory and the formative fiscal federalism theory, Machinjike and Bonga (2021) discovered that fiscal indiscipline promotes budget deficits. It was further explained that fiscal indiscipline is driven by weak budget institutional frameworks, party institutionalization and economic sanctions while strengthening and implementing existing fiscal institutional frameworks, savings during the boom for economic shocks and engagement of the international community on sanctions were suggested as frameworks towards financial discipline. This is in line with evidence from Gollwitzer (2011) in respect to African countries. Between 1984-2016, results showed improved governance and accountability had the highest effect on decreasing budget deficits in 12 West African Countries. It was subsequently suggested that creating incentives for building sound institutions and securing enabling governance would enhance fiscal prudence and sustainability in West Africa (Fagbemi 2020). According to Periola (2019), there are pointers that fiscal discipline was lacking in Nigeria from 1980 to 2015, as primary balance, debt sustainability, expenditure variance, and revenue variance indicated fiscal indiscipline. The author argued further that the level of fiscal discipline is significantly driven by key factors including the number of spending units, government size, and regime type, election period, foreign capital flows (FDI, aids and grants).

Membership variables such as cooperation between regional communities could also be a tool against fiscal divergence among countries (Tapsoba *et al.* 2019). Fiscal rules such as benchmarks and performance cuts are often portrayed as guides to fiscal discipline; however, fiscal rules without political backing or central or decentralized government's will would be ineffective (Schick 2003; Ter-Minassian 2007). In contrast, fiscal transparency does not necessarily translate to improved fiscal outcomes. It has been noted that the budget information for many African countries is not available; in others, it is available but not credible. Evidence has also shown that many countries have credible information available but decide not to publish them (Folscher and Emile G 2012). On investigating the sustainability of fiscal policy in Nigeria over the period 1980-2010, Oyeleke and Ajilore (2014) revealed that fiscal policy was weakly sustainable in the economy of Nigeria, suggesting that the Nigerian budget has been placed outside the constraints and solvency of the nation. Another concept entrenched in the Nigerian budgeting process is budget padding, and this has been adjudged a critical factor in the formation of large and inefficient budgets (Theophilus and Perpetua 2016).

Moreover, the poor budget performance in Nigeria is attributable to the nature of budgetary process which is in turn marred by key challenges including: (1) poor conceptualization of the budget; (2) inadequacy of implementation plans; (3) the non-release or late release of funds; (4) lack of effective monitoring and evaluation procedures; (5) dearth of technical capacity among MDAs, and (6) delays in the passage of the appropriation bill into law (Kingsley and Ehigiamusoe, 2014). Nwaorgu and Alozie (2017) described Nigeria's budget performance as sub-optimal but fairly satisfactory. Following the poor budget processes and fiscal indiscipline across the African continent, there have been calls for budget reforms. However, the African Development Bank opined that it might be challenging to identify ready-made alternatives that can engender improved budget practices across the continent, as improvements will depend on tailor-made approaches that are fitted to address specific issues within each country's budget system (AfDB, 2008). To this end, the current study contributes to the debate on the nexus between fiscal discipline and the budget process in Africa and Nigeria in particular while offering significant innovations, which are discussed in next section.

2.4 Methodology and Analysis

2.4.1 Theoretical Framework

In line with the works of Periola (2019), this study adopts the theory of common pool resource problem as it clearly shows the relationship between the level of fiscal discipline and the transparency of the budget process, amongst other key determinants of fiscal discipline. Following Treisman (2008), local authorities see the central budget or spending plan as a common pool from which diverse groups (neighbourhood government in Treisman model) draw large transfers for their own districts. The central government is assumed to care only for being in power and not for the policy per se. It is thus pre-committed to implement whichever policy promised. This ensures that the central government can credibly commit to a predetermined expenditure level. Treisman assumes that local governments can persuade the central government to satisfy their demands. Local government in Treisman's model can be substituted by spending units such as ministries, departments and agencies (MDAs) responsible for the budget execution. The basic assumptions of the Treisman's (2008) model include: (1) The central government is driven by self-interest; (2) A finite number of spending units (MDAs); (3) Only the central government taxes the citizens, and (4) Identical spending units (MDAs).

Given that a country is divided into $n = 1, 2, \dots, N$ MDAs, each collecting an income y and paying a lump-sum tax T . Let the statutory allocations to the MDAs from the Central government be represented as r_n and are assumed to fund the activities of MDAs, where spending is denoted by g_n . Assume that the statutory transfers were pooled from taxpayers' funds. Now, in this case, the common pool resource is mobilized by the Central government through taxation and the funds realized are redistributed as transfers to the MDAs in a particular fiscal year. Budgeting consists of choosing the expenditure levels for MDAs given the budget constraint (which in this case, are tax revenues). Consider a budget process where each MDA chooses the expenditure level given the choices of other MDAs and the Central government's common resource pool.

Each MDA thus optimizes a payoff function:

$$V_n = h(g_n) + y - T \quad (1)$$

where $h'(\cdot) > 0$; $h''(\cdot) < 0$; and invoking the Inada condition that: $h(0) = 0$; $\lim_{g_n \rightarrow \infty} h'(g_n) = \infty$

Subject to the Central government budget constraint as follows:

$$\sum n g_n = \sum n r_n = nT \quad (2)$$

Equilibrium spending by each MDA is then determined by the first order condition that:

$$h'(g_n^*) = \frac{1}{n} \quad (3)$$

where $h'(g_n^*)$ is the marginal cost of spending and $\frac{1}{n}$ is the perceived price for a rise in an MDA's expenditure level.

Since the MDAs are homogeneous and identical, they select a similar expenditure level. If each MDA had to bear the full cost of its spending plan and fund it with a lump-sum tax, there would be no reallocation of funds from taxpayers' funds and each MDA would be maximizing their payoff (see Eq. 1) subject to the MDA's budget constraint as follows:

$$g_n = T \quad (4)$$

For the n th MDA, the equilibrium condition implies that:

$$h'(g_n^*) = 1 \quad (5)$$

Each MDA pays $\frac{1}{n}$ of a dollar expended, whereas in the second occurrence, each MDA endured the total cost of its spending by repaying the genuine price of a rise in its spending level. Hence, the marginal cost of the spending is lower in eq. 3 - where redistribution of common pool resource is possible - than in eq. 5 - which allows each MDA to bear the full cost of their additional spending plan. Finally, the Common Pool Resource problem emanated from the inability of policy makers to coordinate the activities and spending pattern of the spending units (that is, the MDAs) since the MDAs do not bear the full cost of their spending plan (see Periola 2019).

2.4.2 Empirical Model Specification

The extant literature has measured fiscal discipline, most especially, in diverse ways. Fiscal discipline has been measured in terms of the variance between actual and budgeted expenditure and revenue, as well as, the budget adoption time (Hou and Willoughby 2010; Periola 2019); in terms of debt sustainability level (see, Freitag and Vatter 2008; Hitaj and Onder 2013; Joy and Panda 2021), and the ratio of primary balance to GDP (Ardagna 2004 and Branch and Adderley 2009). In terms of the determinants of fiscal discipline, the literature has identified factors including: election period, foreign capital inflows (aids and grants, FDI), trade openness, external reserves, political regime, government size, transparency index, number of spending units, and a measure of persistence effects to reflect the dynamic nature of fiscal discipline (see Persson and Tabellini 2001; El-Shagi 2010; Puonti 2010; Neyapti 2013; Periola 2019).

To differ from past works, the current study measures fiscal discipline and the budget process in line with the peculiarities of the Nigerian economy. Fiscal discipline is defined as the difference between the actual fiscal deficit (% of GDP) and the 3% target stipulated in the 2007 Fiscal Responsibility Act. Fiscal discipline is also measured as the gap between the actual public debt (% of GDP) and the level that is considered sustainable as stipulated by the Joint Sustainability Results of the IMF and the World Bank. The present study also employs from the control variables established in the empirical literature. Particularly, this study employs the budgeting types as the proxy for the budget process.

Overtime, Nigeria has operated two budgeting types, namely, the zero-based and incremental budgeting. Zero-based budgeting is a budgeting process that allocates funding based on program efficiency and necessity rather than budget history. It sets the tone to review every program and expenditure at the beginning of each budget cycle and must justify each line item in order to receive funding (Deloitte 2015; Beredugo 2019). This budgeting method utilizes much more details and holds the MDAs more accountable. Conversely, incremental budgeting begins with the budget from the last period. Once there is an established starting point, if a department needs more money than the previous budget, they have to be able to justify the extra expenses (Beredugo 2019). Also, if you do not use your budget, then the next period's budget will be reduced. In 2016 the Federal Government of Nigeria shifted from the incremental budgeting to the zero-based budgeting method (Beredugo 2019).

In light of the aforementioned, this study specifies the dynamic model of fiscal discipline in line with the original developers of the autoregressive distributed lag (ARDL) model, namely Pesaran *et al.* (2001), as follows:

$$\Delta FSD_t = \alpha_1 FSD_{t-1} + \alpha_2 AIDS_{t-1} + \alpha_3 GOVS_{t-1} + \gamma BDP + \theta POLR + \sum_{i=1}^{p-1} \delta_i \Delta FSD_{t-i} + \sum_{j=0}^{q_3-1} \mu_j \Delta AIDS_{t-j} + \sum_{j=0}^{q_3-1} \rho_j \Delta GOVS_{t-j} + \epsilon_t \quad (6)$$

The error correction representation of eq. 6 is derived as follows:

$$\Delta FSD_t = \alpha_1 \left(FSD_{t-1} - \left[-\frac{\alpha_2}{\alpha_1} AIDS_{t-1} - \frac{\alpha_3}{\alpha_1} GOVS_{t-1} \right] \right) + \gamma BDP + \theta POLR + \sum_{i=1}^{p-1} \delta_i \Delta FSD_{t-i} + \sum_{j=0}^{q_3-1} \mu_j \Delta AIDS_{t-j} + \sum_{j=0}^{q_3-1} \rho_j \Delta GOVS_{t-j} + \epsilon_t \quad (7)$$

By letting,

$$ECT = FSD_{t-1} - \beta_1 AIDS_{t-1} - \beta_2 GOVS_{t-1} \quad (8)$$

$$\text{where: } \beta_1 = -\frac{\alpha_2}{\alpha_1}, \quad \beta_2 = -\frac{\alpha_3}{\alpha_1} \quad (9)$$

Eq. 7 therefore becomes:

$$\Delta FSD_t = \alpha_1 ECT + \sum_{j=0}^{q_3-1} \mu_j \Delta AIDS_{t-j} + \sum_{j=0}^{q_3-1} \rho_j \Delta GOVS_{t-j} + \epsilon_t \quad (10)$$

Description of Terms

ECT is the error correction term, with its associated coefficient (α_1) being the adjustment parameter. It measures the speed at which the dependent variable (which in this case is Nigeria's fiscal discipline indicator) adjusts from its short-run fluctuations to its long-run equilibrium value. The convergence criteria hold that the adjustment parameter is negative, less than 1 in absolute value, and statistically significant at any of the conventional levels; Fiscal discipline (*FSD*) is measured using two proxies: the deviation of fiscal deficit from

the 3% Fiscal Responsibility Act 2007 (FSD_F) (fiscal gap, subsequently) and the deviation of public debt from the IMF's minimum debt burden threshold/distress point of 35% (FSD_P) (public debt gap, subsequently). BDP is the proxy for the budget process, which in this case are the budgeting types/practice, which is a dummy variable that takes the value of 1 for the period of zero-based budgeting and 0 otherwise (incremental budgeting era); $POLR$ is the dummy variable for political regime which takes the value of 1 for democratic system and 0 for military regime; Both budget process and political regime are classified as fixed regressors. $AIDS$ is net foreign aids received (% of GNI); $GOVS$ is government size, proxied by total government spending (% of GDP); Δ is the first difference operator, δ_i , γ , θ , μ_j , ρ_j are short-run parameters while β_1 , β_2 are long-run parameters, $p - 1$ is the maximum lag length for the dependent variable whereas $q_j - 1$ for $j = 1, 2, 3, 4$ are the maximum lag lengths for the explanatory variables, and ϵ_t is the error term, and " t " stands for time. The A priori expectation goes thus: $\delta_i > \text{or} < 0$; $\gamma > \text{or} < 0$; $\theta > \text{or} < 0$; $\mu_j < 0$; $\rho_j < 0$ and $\beta_1 < 0$; $\beta_2 < 0$.

2.4.3 Estimation Procedure

The study adopts the framework of autoregressive distributed lag model (ARDL) for the following reasons. *First*, ARDL model allows for both the static and dynamic effect(s) of the independent variable(s) on the dependent variable unlike a static model that accounts for static or fixed effect(s) only. *Second*, ARDL framework offers a technique for checking the existence of a long-run relationship between variables, and that is referred to as the *Bounds test*. Bounds test is flexible as it accommodates both stationary and integrated series unlike other tests of cointegration, such as, Engle-Granger and Johansen tests, which considers only non-stationary series that are integrated of the same order. Before model estimation, it is important to check the time-series properties such as unit root and cointegration to avoid the estimation of spurious regression. To achieve this, the present study adopts the Augmented Dickey-Fuller (ADF) test and the Bounds test for cointegration.

The ADF unit root test is conducted to check if series are stationary or not. The null hypothesis is that a series has a unit root or is nonstationary. If the ADF tau stat is greater, in absolute terms, than the MacKinnon critical values at any chosen level of significance, the null hypothesis is rejected, otherwise, we will fail to reject the null hypothesis of a unit root. Following Nelson and Plosser (1982), macroeconomic variables (nominal and real) have two components including, a secular (or growth) component and a cyclical component. This therefore calls for the distinction between deterministic trend and stochastic trend. The distinction between stationary and non-stationary stochastic process (or time series) has a crucial bearing on whether the trend (the slow long-run evolution of the time series under consideration) observed in actual economic time series is deterministic or stochastic (see Adekunle 2021). Generally, if the trend in a time series is a deterministic function of time, such as time, time-squared, and so on (that is, completely predictable trend), it is called a deterministic trend, whereas if the trend is not predictable, it is called a stochastic trend (Gujarati and Porter 2009, 745).

Similarly, the Bounds test for cointegration tests the null hypothesis that there is no cointegration between fiscal deficit and its determinants (that is, other macroeconomic indicators). To conclude the presence or absence of cointegration, there is need to compare the computed F-stat with the critical bound values, that is, I0 bound (the lower bound) and I1 bound (the upper bound) at any chosen level of significance. If the F-stat is less than the I0 critical value at any chosen level of significance, then there is no cointegration. However, if the F-stat is greater than the I1 critical value at any chosen level of significance, then there is cointegration. However, if the F-stat lies between the I0 and I1 critical values at all levels of significance, then the test result is inconclusive. when there is cointegration between the explanatory variables (X 's) and the dependent variable (y), both the short-run model with error correction term (ECT) as in Eq. 10 and the long-run model as in Eq. 8 would be estimated. However, if the X 's and y are not cointegrated, then only the short-run model without ECT as in Eq. 6 which is the original ARDL model would be estimated.

2.4.4 Data Description and Sources

The study is conducted for the Nigerian economy, upon which secondary data on variables of interest are drawn from the World Bank's World Development Indicator, the IMF's International Financial Statistics (IFS) and the Central Bank of Nigeria Statistical Bulletin. Data were collected for total government expenditure (% of GDP), fiscal deficit (% of GDP), public debt (% of GDP) and net foreign aid received (% of GNI) were collected over the period of 1990 to 2020. The binary values assumed by the dummy variables for political regime and budgeting practice were determined by the author. The study also adopted the 2007 Fiscal Responsibility Act fiscal deficit target of 3% of GDP and the IMF's minimum debt burden threshold of 35%.

3. Results and Discussion

3.1 Graphical Representation of Fiscal Discipline Indicators

Figures 1 and 2 show the trends of fiscal and public gaps, respectively, over the period from 1990 to 2020. In terms of fiscal deficit measure of fiscal discipline, post-2007, Nigeria was able to operate below the 3% fiscal deficit target in three years: 2017, 2019 and 2020. The remaining period of 2008-2016 and 2018 were marred with over-bloated public spending such that the country exceeded the 3% target. Notably, the period encapsulates two election years of 2011 and 2015, where the fiscal gap stood at 1.18 and 1.36 percentage points, respectively. This result is in line with the findings and assertions of Hanusch and Vaaler, (2013); and Periola (2019) that amid election period, government authorities have little scope to oblige to fiscal discipline, as they stay suspend or even reduce taxes in order to win a re-election bid. The outbreak of the coronavirus pandemic in 2019 and continued spread in 2020 constrained public finances and ultimately reflected in improved government's compliance to the 3% fiscal deficit target.

In April 2005, the IMF introduced the Debt Sustainability Analysis for its Low Income Member Countries. This period coincided with the era of debt forgiveness enjoyed by these countries, including Nigeria, when the country's public debt stock fell sharply from US\$36 billion in 2004 to US\$4 billion in 2006 (see Jarju *et al.* 2016 and Adekunle *et al.* 2021). Correspondingly, public debt-GDP ratio plunged from 35.5% to 9.4% over a similar period. Meanwhile, public debt profile has continuously followed an upward trend since 2014 when public debt stock stood at US\$100 billion and rising by 50% to climax at US\$150 billion in 2020, at the height of the COVID-19 crisis (see, IMF, 2021a). Over a similar period, Nigeria's public debt stock rose from 17.5% of GDP to 35.1% (see IMF, 2021b). This however threatens the country's debt sustainability and put her at high risk of debt default as the current public debt-to-GDP ratio is just 10 basis points above the IMF's minimum debt burden target of 35%. This ultimately reflects the gross fiscal indiscipline on the Nigerian government which has taken on debt accumulation as a habit, particularly from 2014 till date.

Figure 1. Fiscal Deficit (% of GDP) and 3% Fiscal Responsibility Act Target

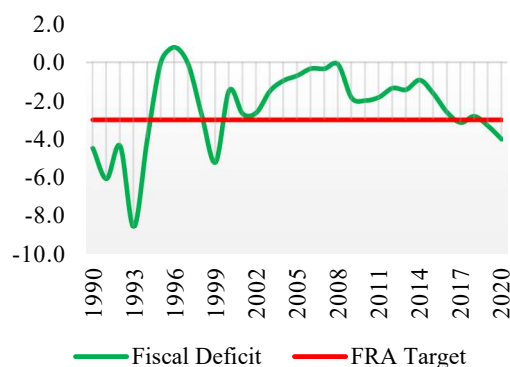
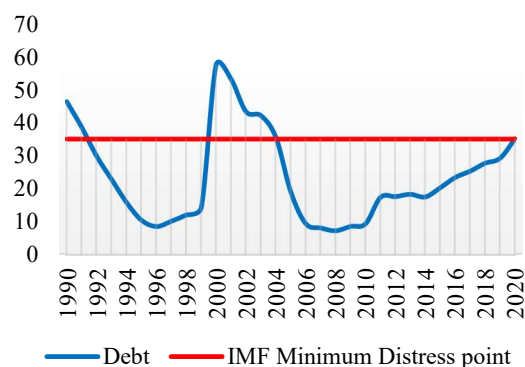


Figure 2. Public Debt (% of GDP) and 35% IMF's Minimum Threshold/Distress Point



Source: Based on Data from CBN Statistical Bulletin and IMF's Statistics.

3.2 Descriptive Statistics

The summary statistics for the quantitative economic indicators including the two measures of fiscal discipline (fiscal gap and public debt gap), net foreign aids received (% of GNI) and a measure of government size (total public spending, % of GDP) are presented in Table 1. Nigeria could be said to be financially undisciplined in terms of the fiscal deficit gap, which averaged 0.67 percentage points between 1990 and 2020. However, public debt gap averaged -11.32 percentage points; implying historical improvement of Nigeria at satisfying the IMF's minimum debt burden threshold, until more recently when there is weak compliance. Nigeria is indeed a net receiver and beneficiary of foreign aid flows as her net official development assistance (ODA) receipts averaged 0.79% of Gross National Income (GNI). Government size as measured by total public spending averaged 8.6% of Gross Domestic Product (GDP). In terms of volatility as measured by standard deviation, public debt gap is the most volatile series while net foreign aids received is the least volatile series. The Jarque-Bera statistics shows that only public debt gap follows a normal distribution while other quantitative variables do not.

Table 1. Summary Statistics

Variable	No. of Observation	Mean	Std. Deviation	Jarque-Bera Stat [prob.]
FSD_F	31	0.6679	2.0125	7.9094[0.0192]
FSD_D	31	-11.3244	14.1718	3.4682[0.1766]
AIDS	31	0.7914	1.0024	200.6814[0.0000]
GOVS	31	8.6034	2.8085	13.2061[0.0014]

Source: Authors' computation.

3.3 The Unit Root Test Result

The result of the conventional ADF unit test based on three possible test regressions is presented in Table 2. It can be observed that all variables, except government size indicator (public spending), are stationary at levels and are said to be integrated of order zero (that is, $I(0)$). The implication of this result is that utilizing a combination of stationary and non-stationary series without running a cointegration test would only lead to estimating a spurious regression in the words of Granger and Newbold (1974).

Table 2. Result of the ADF Unit Root Test

Variable	Level	First Difference	Order of integration
FSD_F	-3.0867**b	-----†	$I(0)$
FSD_P	-1.8117*c	-----	$I(0)$
AIDS	-3.9873***b	-----	$I(0)$
GOVS	-2.8599a	-4.6242***a	$I(1)$

Note: ***, **, * indicate the rejection of the null hypothesis of a unit root at 1%, 5% and 10%, respectively; $I(d)$ is the order of integration and it refers to the number of differencing required for a series to become stationary; † implies that a series that is stationary at levels does not require its first difference being reported; a, b and c denote models with intercept and trend, with intercept only and with none, respectively.

Source: Authors' computation.

3.4 The Cointegration Test Result

Since the unit test root result has confirmed that the quantitative variables employed in this study are a combination of different orders of integration, the ARDL Bounds test for cointegration becomes plausible. Result of the Bounds test (see Table 3) shows that irrespective of the measure of fiscal discipline, there is a long-run equilibrium relationship between fiscal discipline and its probable determinants including the key explanatory variable (the budget process), as well as, the control variables including political regime, net foreign aids received and government size. This conclusion is based on the fact that the F-statistics associated with both specifications are greater than the upper critical bounds at 1% level of significance.

Table 3. Result of Bounds cointegration Test

	Model I		Model II	
F-statistic	20.5758		11.9028	
	Critical values		Critical values	
Significance level	$I(0)$ Bound	$I(1)$ Bound	$I(0)$ Bound	$I(1)$ Bound
10%	4.19	5.06	3.17	4.14
5%	4.87	5.85	3.79	4.85
2.5%	5.79	6.59	4.41	5.52
1%	6.34	7.52	5.15	6.36

Note: Models I and II utilize the fiscal deficit gap and public debt gap as proxies for fiscal discipline, respectively.

Source: Authors' computation.

3.5 The Regression Result

The validation of the existence of cointegration between fiscal discipline indicators and its probable determinants suggests the need to present the short-run and long-run estimates (see Table 4). With respect to the key explanatory variable - the budget process (measured in terms of budgeting type/practice), the associated coefficients suggest zero-based budgeting narrows fiscal deficit gap and public debt gap than the alternative incremental budgeting. The coefficients -0.1343 and -9.4263, respectively, indicate that the gaps in fiscal deficit and public debt stock narrow under zero-based budgeting relative to incremental budgeting by 0.13

and 9.42 percentage points. By implication, zero-based budgeting instills greater fiscal and financial discipline than does incremental budgeting. This result parallels the findings of Deloitte (2015) and Beredugo (2019) that zero-based budgeting offers more transparency and accountability among public officials than incremental budgeting. This study also established that the gaps in fiscal deficit and public debt stock are wider under a civilian regime compared to a military dispensation. The associated coefficients, 2.5865 and 10.3376 implies that fiscal deficit and public debt gaps are 2.59 and 10.34 percentage points narrower under military rule relative to the respective gaps under civilian administration. This is one major reason for military take-over of government in Nigeria's history. The result however contradicts the conventional wisdom or ideal case that democracy improves fiscal discipline while a dictatorial type is usually less disciplined (see Persson and Tabellini 2001).

Foreign aids, like any other forms of foreign capital flows, helps to circumvent weak domestic resource mobilization to meet a country's development needs, thereby offering less scope for additional borrowing. The current study established the validity of this assertion as fiscal deficit gap and public debt gap narrow on average by 0.18 and 2.78 percentage points for every 1 percentage point increase in net foreign aid received. The impact is significant only for the public debt gap proxy of fiscal discipline both in the short run and the long run. This result is in consonance with the findings and assertions of Puonti (2010) and Periola (2019) that foreign aids that is tied to budget support strengthens the transparency of the budget process and instills greater fiscal discipline. The fiscal discipline impact of an increasing government size is sensitive to the indicators of fiscal discipline. This parallels with the findings of Periola (2019) where government size exerts positive and negative effects on fiscal discipline measured in terms of fiscal balance (% of GDP) and debt sustainability level/public debt (% of GDP), respectively. Notwithstanding, this study establishes the reverse case of Periola (2019)'s findings; as 1 percentage point increase in government size (public spending) would on average significantly narrow fiscal deficit gap by 0.74 and 1.52 percentage points over the short-term and the long-term horizons, respectively. Conversely, an increasing government size significantly translates to gross fiscal indiscipline by widening public debt gap by 2.28 percentage points in the long run.

Table 4. Short-run and Long-run ARDL Estimates of the Determinants of Fiscal Discipline in Nigeria

	Model I	Model II
Dependent variable	FSD_F _t	FSD_P _t
<i>Short-run Estimates</i>		
ECT	-0.4896*** (0.0059)	-0.4239*** (0.0679)
BDP	-0.1343 (0.7392)	-9.4263*** (3.1832)
POLR _t	2.5865*** (0.7945)	10.3376*** (2.6928)
ΔAIDS _t	-0.1779 (0.2041)	-2.7824** (1.0609)
ΔGOVS _t	-0.7421*** (0.1202)	-0.2881 (0.4466)
TREND	-0.2597*** (0.0778)	-
C	9.0489*** (2.1855)	-21.8451
<i>Long-run Estimates</i>		
AIDS _t	-0.3634 (0.3188)	-3.7669** (1.3592)
GOVS _t	-1.5156*** (0.4973)	2.2767*** (0.6197)
Adjusted R ²	0.6912	0.6379
F-statistic	17.2262 (0.0000)	11.2189 (0.0000)
Ramsey RESET: F-stat	0.6744 [0.4208]	0.1086 [0.7448]
Autocorrelation test: LM stat	2.9959 [0.2236]	2.9467 [0.2292]
Heteroscedasticity test: ARCH LM stat	0.0033 [0.9542]	0.0074 [0.9314]
Normality test: Jarque-Bera stat	0.8006 [0.6701]	3.5597 [0.1687]

Note: ***, **, * indicate the statistical significance of coefficients at 1%, 5% and 10% respectively; the values in parentheses and block brackets are, respectively, the standard errors and the probabilities. LM implies Lagrangian multiplier. ARCH stands for Autocorrelation conditional heteroscedasticity, while RESET means Regression Error Specification Test.

Source: Authors' computation.

Moreover, the coefficient on the error correction term or the adjustment parameter is correctly signed and is statistically significant at the 1% level irrespective of the measure of fiscal discipline. The coefficients -0.4896 and -0.4239 implies the past disequilibrium errors are corrected per annum at the rate of 48.9% and 42.4% for fiscal deficit gap and public debt gap, respectively. This study also establishes that fiscal deficit gap exhibits some form of historical downward trend as earlier confirmed from the graphical representation of the two measures of fiscal discipline employed in this paper. The coefficient of determination for both models

showed that all the explanatory variables (budget process indicator, political regime indicator, net ODA receipts government size and the trend variable) explains about 69% of the total variation in fiscal discipline (fiscal gap) and about 64% in the case of the public debt gap proxy. This claim is supported by the large F-statistics that imply the overall significance of both models at 1% level of significance. We further justify the findings that socio-economic factors significantly explain the level of fiscal discipline in Nigeria than does the time-series forecast models including AR(1), MA(1) and ARMA(1,1) specifications (Refer to Figures A1 and A2 in the Appendix). Lastly, the post-estimation diagnostics performed on both specifications suggest that the models do not suffer from problems, such as, misspecification error, non-normality of the residuals, autocorrelation in residuals and ARCH effects in residuals, as we could not reject the null hypothesis that these problems are absent at 10% level of significance ($p > 0.1$).

Conclusion and Policy Recommendation

This study investigated the nexus between fiscal discipline and the budget process with reference to Africa's largest economy, Nigeria, between 1990 and 2020. The overall results revealed that the level of fiscal discipline, as measured by two proxies of fiscal deficit gap and public debt gap, is more enhanced under zero-based budgeting system than under the current incremental budgeting technique. The study also established that the era of civilian administrations is more prone to fiscal indiscipline relative to military dispensations. Moreover, the study offered evidence of the significant widening gap effects of an increasing government size in the long run, while it established a significant narrowing gap effect in the case of net foreign aid receipts over the short-term and long-term horizons. These findings ultimately birth key action points for the Nigerian government including: (1) the need to revert to zero-based budgeting to entrench transparency in public budgeting process; (2) the need to strengthen anti-graft at all levels of government since the current realities have shown that corrupt practices exist top-down, bottom-up, irrespective of political regime; (3) foreign aids tied to budget support should be well managed to avoid expending realized funds on frivolities and misplaced priorities at all levels of government in Nigeria; (4) there is an urgent to reduce government size as there are valid claims that Nigeria runs one of the most expensive government and public affairs globally.

References

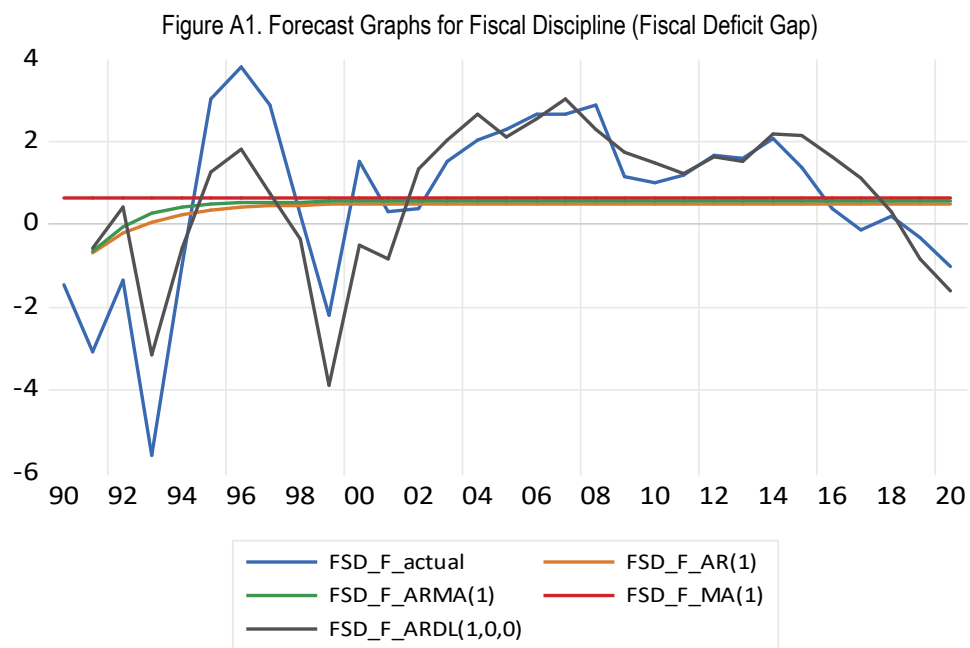
- [1] Adekunle, W. (2021). A Re-examination of the relationship between Foreign capital flows and Economic growth in Nigeria. Master's Thesis submitted to the Department of Economics, University of Ibadan, Nigeria, retrieved from: <https://www.researchgate.net/>
- [2] Adekunle, W., Adeniyi, O. and Orekoya, S. (2021). Non-linear Relation between External Debt and Economic Growth in Nigeria: Does the Investment Channel Matter? *Iranian Economic Review*, 25(1): 45-56.
- [3] AfDB. (2008). Budget Practices and Procedures in Africa. pg 44-46.
- [4] Alles, L., Jayathilaka, R., Kumari, N., Malalathunga, T., Obeyesekera, H., and Sharmila, S. (2021). An investigation of the usage of capital budgeting techniques by small and medium enterprises. *Quality and Quantity*, 55(3): 993–1006.
- [5] Beredugo, S.B., Azubike, J.U.B. and Okon, E.E. (2019). Comparative Analysis of Zero-Based Budgeting and Incremental Budgeting Techniques of Government Performance in Nigeria. *International Journal of Research and Innovation in Social Science*, 3(6), 238-243.
- [6] Bevan, D. (2010). *Fiscal Implications of the Global Economic and Financial Crisis for Low-Income Countries*. Constraints, March.
- [7] Bevan, D. (2010). *Fiscal Implications of the Global Economic and Financial Crisis for Low-Income Countries*.
- [8] Branch, S. G. and Adderley, S. S. (2009). Fiscal discipline in the achievement of fiscal and debt sustainability in the Bahamas. *Journal of Business, Finance and Economics in Emerging Economies*, 4(2): 456-476.
- [9] Buchanan, J. M. (1967). *Public finance in democratic process: Fiscal institutions and individual choice*. UNC Press.

- [10] Buchanan, J. M. and Gordon, T. (1962). *The calculus of consent: Logical foundations of constitutional democracy*. URT Press.
- [11] Dafflon, B. (2012). *Voluntary amalgamation of Local Governments: The Swiss debate in the European context*. International Center for Public Policy. Working Paper Series, at AYSPS, GSU paper 1204.
- [12] Deloitte (2015). *Zero-Based Budgeting: Zero or Hero?* Deloitte Development LLC. All rights reserved. Member of Deloitte Touche Tohmatsu Limited.
- [13] Duncan, B. (1948). On the rationale of group decision-making. *Journal of Political Economy*, 56: 23–34.
- [14] Egwaikhide, F., Chete, L., and Falokun, G. (1994). Exchange Rate Depreciation, Budget Deficit and Inflation - The Nigerian Experience. Papers, November.
- [15] Ejiogu, A., Okechukwu, O., and Ejiogu, C. (2020). Nigerian Budgetary Response to the COVID-19 Pandemic and its Shrinking Fiscal Space: Financial Sustainability, Employment, Social Inequality and Business Implications. *Journal of Public Budgeting, Accounting and Financial Management*, 1–18. DOI:<https://doi.org/https://doi.org/10.1108/JPBAFM-07-2020-0101>
- [16] Fagbemi, F. (2020). Assessing the Role of Governance in West African Fiscal Performance. *American Economist*, 65(1): 97–122. DOI: <https://doi.org/10.1177/0569434519857593>
- [17] Folscher, A., and Emile G. (2012). *Fiscal Transparency and Participation in Africa*. October.
- [18] Gollwitzer, S. (2011). Budget institutions and fiscal performance in Africa. *Journal of African Economies*, 20(1): 111–152.
- [19] Granger, C.W.J. and Newbold, P. (1974). Spurious Regressions in Econometrics. *Journal of Econometrics*, 2: 111-120
- [20] Gujarati, D.N. and Porter, D.C. (2009). *Basic Econometrics*. Published by McGraw-Hill Irwin, New York, USA. ISBN: 978-007-127625-2
- [21] Gyimah-Brempong, K. (1998). The Political Economy of Budgeting in Africa.
- [22] Hallerberg, M., Strauch, R. R. and Hagen, J. (2009). *Fiscal governance in Europe*. Cambridge University Press.
- [23] Hanusch, M., & Vaaler, P. M. (2013). Credit rating agencies and elections in emerging democracies: Guardians of fiscal discipline? *Economics Letters*, 119(3): 251-254. DOI:<https://doi.org/10.1016/j.econlet.2013.03.004>
- [24] Hemming, R., Kell, M. and Mahfouz, S. (2002). The Effectiveness of Fiscal Policy in Stimulating Economic Activity,” IMF Working Paper No. 02/208 (Washington: International Monetary Fund).
- [25] Hou, Y. and Willoughby, K. (2010). Fiscal discipline in sub-national governments: A capacity measure of financial management in American governments. (unpublished report).
- [26] IMF: International Monetary Fund (2021a). International Financial Statistics.
- [27] IMF: International Monetary Fund (2021b). World Economic Outlook April 2021.
- [28] Jarju, I., Nyarko, E., Adams, K., Haffner, O., and Odeniran, O. S. (2016). The Relationship between External Debt and Economic Growth in the West African Monetary Zone: A Panel Data Analysis. West African Monetary Institute (WAMI) Occasional Paper, 12, Retrieved from <https://ideas.repec.org/p/wam/wpaper/12.html>
- [29] Joy, J., & Panda, P. K. (2021). An empirical analysis of sustainability of public debt among BRICS nations. *Journal of Public Affairs*, 21(2): e2170. DOI: <https://doi.org/10.1002/pa.2170>
- [30] von Hagen, J., Harden, I. and Tanzi, V. (1996). Budget Processes and Commitment to Fiscal Discipline. Available at: <https://isni.org/isni/0000000404811396>, International Monetary Fund.
- [31] Kenneth, A. (1963). Uncertainty and welfare economics. *The American Economic Review*, 53(5): 941-973

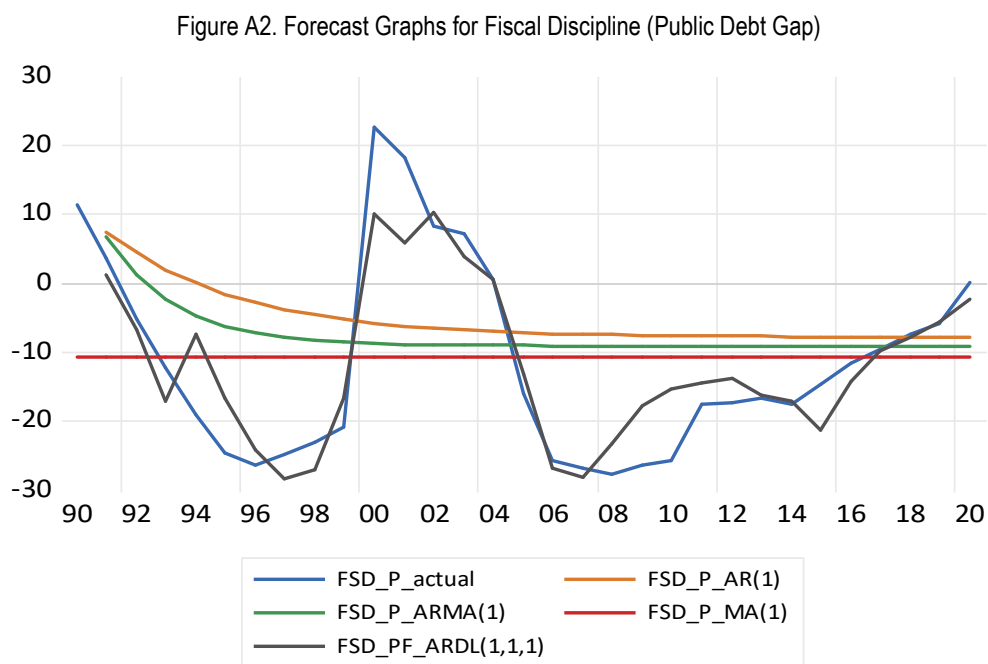
- [32] Khan, A. and Hildreth, W.B. (2002). Budget Theory in the Public. Quorum Books, Greenwood Publishing Group, 297. Available at: <http://www.untagsmd.ac.id/>
- [33] Kingsley, O. K., and Ehigiamusoe, K. (2014). Capital Budget Implementation in Nigeria: Evidence from the 2012 Capital Budget. Econstor.
- [34] Kontopoulos, Y., and R. Perotti (1999). Fiscal institutions and fiscal performance, in government fragmentation and fiscal policy outcomes: Evidence from OECD countries, ed. by J. Poterba, and J. von Hagen. University of Chicago Press.
- [35] Kouassy, O., and Bohoun, B. (1993). the Determinants of Fiscal Deficit and Fiscal Adjustment in Cote D'Ivoire (Issue July).
- [36] Long, L. C., Rosen, S., Meyer-rath, G., Nichols, B., Larson, B. A., and Ndlovu, N. (2021). Getting resources to those who need them: the evidence we need to budget for underserved populations in sub-Saharan Africa. *Journal of International Aids Society*, 24: 67–72. DOI: <https://doi.org/10.1002/jia2.25707>
- [37] Machinjike, N., and Bonga, W. G. (2021). Fiscal Discipline and Budget Processes: Evidence from Zimbabwe. *International Journal of Research and Innovation in Social Science*, 05(02): 607–616. DOI:<https://doi.org/10.47772/ijriss.2021.5231>
- [38] Mawejje, J., and Odhiambo, N. M. (2020). The determinants of fiscal deficits: a survey of literature. *International Review of Economics*, 67(3): 403–417. DOI: <https://doi.org/10.1007/s12232-020-00348-8>
- [39] Moore, P. (1980). Types of Budgeting and Budgeting Problems in American Cities. *International Journal of Public Administration*, 2(4): 501–514. DOI: <https://doi.org/10.1080/01900698008524392>
- [40] Nelson, C.R. and Plosser, C.I. (1982). Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications. *Journal of Monetary Economics*, 10: 139-162.
- [41] Neyapti, B. (2013). Fiscal decentralization, fiscal rules and fiscal discipline. *Economics Letters, Elsevier*, 121(3): 528-532.
- [42] Machinjike, N. and Wellington, G.B. (2021). Fiscal Discipline and Budget Process: Evidence from Zimbabwe. *International Journal of Research and Innovation in Social Sciences (IJRISS)*, V(II): 607-616.
- [43] Nwaorgu, I., and Alozie, C. (2017). Budget Evaluation and Government Performance: A Case of the Nigerian Economy. *Journal of Economics, Management and Trade*, 20(1): 1–17. DOI:<https://doi.org/10.9734/jemt/2017/34646>
- [44] Olaoye, F. O. (2014). An Exploratory Evaluation of Legislative Lawlessness in the Nigerian Budget Process. *Singaporean Journal of Business, Economics and Management Studies*, 3(2): 39–47. DOI:<https://doi.org/10.12816/0007338>
- [45] Olehinwa, O., and James, N. (2012). Theory and Practice of Government Accounting in Nigeria. *African Journal of Business Ethics*, 6(1): 93. DOI: <http://ajobe.journals.ac.za>
- [46] Olurankinse, F. (2012). Due Process and Budget Implementation: An Evaluation of Nigerian Public Sector Auditing. *Asian Journal of Finance and Accounting*, 4(2): 144–154. DOI:<https://doi.org/10.5296/ajfa.v4i2.1689>
- [47] Oyeleke, O. J., and Ajilore, O. T. (2014). Analysis of Fiscal Deficit Sustainability Economy: An Error Correction Approach. *Review of Conceptual and Empirical Literature*, 4(2): 199–210.
- [48] Periola, O. (2019). Determinants of Fiscal Discipline in Nigeria 1980-2015 (Vol. 11, Issue 1). <http://scioteca.caf.com/>
- [49] Persson, T. and Tabellini, G. (2001). Political institutions and policy outcomes: What are the stylised facts? CEPR Discussion Papers 2872, C.E.P.R. Discussion Papers.
- [50] Pesaran, M. H., Shin, Y. and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16 (3): 289-326.
- [51] Puonti, P. (2010). Interplay of aid and fiscal policy: Does budget support induce greater fiscal discipline. Aalto University, school of business, department of economics thesis. Thesis number: 12399.

- [52] Ray, R. (2020). Social Welfare Administration.
- [53] Rubin, I. (2007). The great unraveling: Federal budgeting, 1998-2006. *Public Administration Review*, 67(4): 605-794.
- [54] Schick, A. (2003). The Role of Fiscal Rules in Budgeting. *OECD Journal on Budgeting*, 3(3): 7–34. DOI:<https://doi.org/10.1787/budget-v3-art14-en>
- [55] Ardagna, S., Caselli, F. and Lane, T. (2004). Fiscal Discipline and the Cost of Public Debt Service: Some Estimate for OECD Countries. International Monetary Fund Working Paper Series, European Central Bank, No. 411, November, 2004.
- [56] Sunday, I.O. (2016). Discuss on Fiscal Discipline and Corporate Governance in the Public Sector in Nigeria. Available at: <https://doi.10.22495/cocv13i3c3p14>
- [57] Tapsoba, S.J., Sembene, D., Gammadigbe, V., and Issifou, I. (2019). Fiscal Convergence in Africa: What Role for Regional Economic Communities? *Journal of Economic Integration*, 34(2): 214-235.
- [58] Ter-Minassian, T. (2007). Fiscal Rules for Subnational Governments. *OECD Journal on Budgeting*, 6(3): 1–11. DOI: <https://doi.org/10.1787/budget-v6-art17-en>
- [59] Theophilus, A. A., and Perpetua, E. C. (2016). Budget Padding: The Nigerian Perspective. *International Journal of Advanced Academic Research*, 2(12): 41–56.
- [60] Treisman, D. (2008). *The architecture of government: Rethinking political decentralization*. Cambridge studies in comparative politics. Cambridge University Press.
- [61] Weingast, B. R., Shepsle, K. A. and Johnsen C. (1981). The political economy of benefits and costs: A neoclassical approach to distributive politics. *Journal of Political Economy*, 89(41): 642–664.
- [62] Wyplosz, C. and Kostrup, S. (2010). A common pool theory of supranational deficit ceilings. *European Economic Review*, 54 (2): 269–278.

Appendix

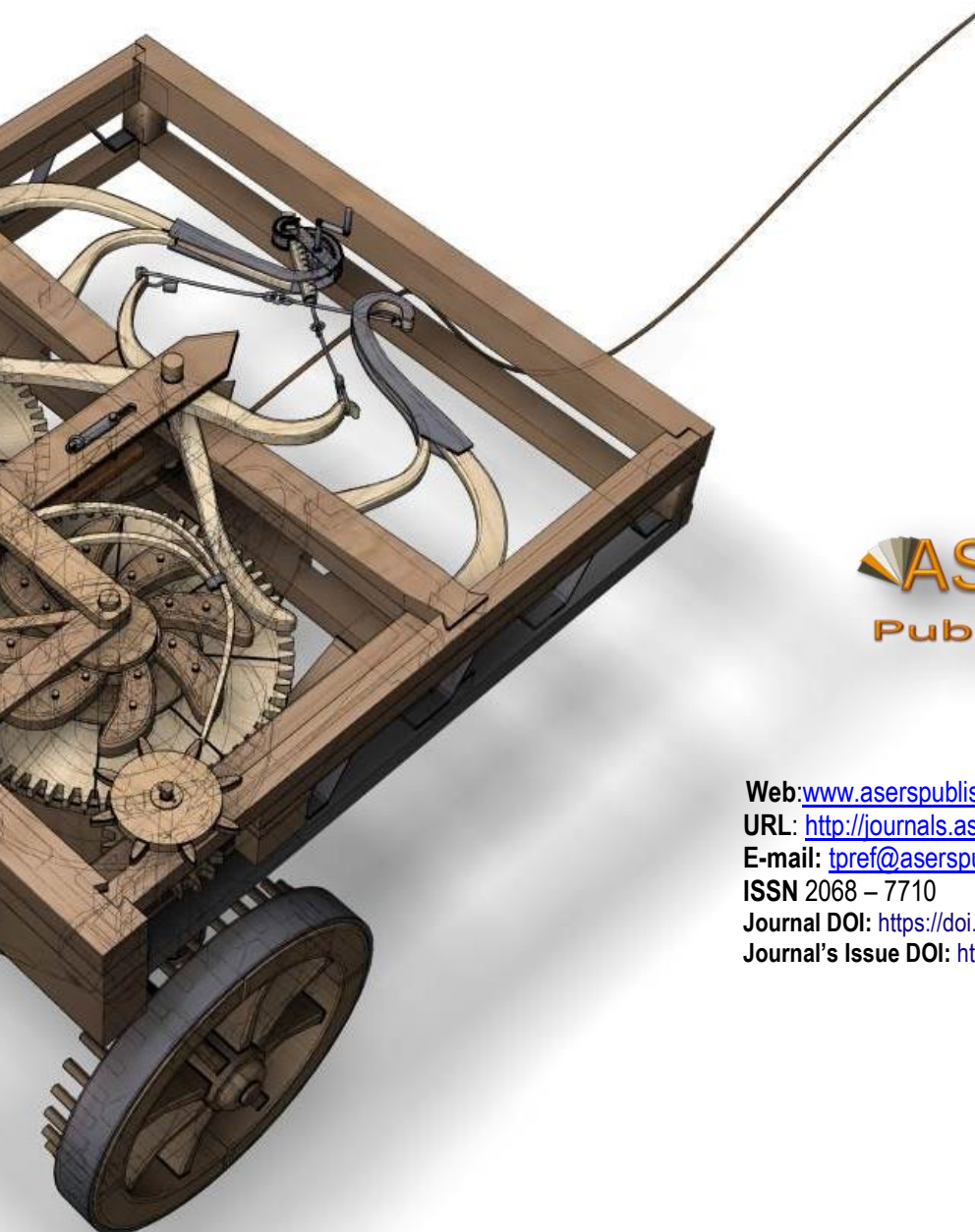


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