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KURS FRANKA SZWAJCARSKIEGO W WYBRANYCH BANKACH W POLCE W KONTEKŚCIE KREDYTÓW HIPOTECZNYCH

ABSTRACT

The purpose of the article. The aim of the article is to assess the marketability of the CHF/PLN offer rate of selected banks in Poland in the years 2006-2023. This problem is important due to mortgage loans in foreign currencies, which were related to the obligatory purchase of the loan currency from the bank that raised questions among borrowers about the market nature of the rates offered by financial institutions.

Methodology. The analysis of the offer CHF/PLN exchange rates was carried out in the Python environment using tools for examining exchange rate volatility and assessing the distribution of margins offered by selected banks.

Results of the research. The research results showed that the margin policy changed in banks during the analyzed period and depended on market factors such as the strengthening of the Swiss currency due to the liberalization of its exchange rate. It was also found that there was no interference in formation of exrates, and they behaved in accordance with the trends set by Forex and competition.

Keywords: CHF/PLN offer rate, volatility, marketability

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1. Wstęp

W niniejszym artykule podjęto próbę oceny kształtowania kursów sprzedaży CHF/PLN przez wybrane banki w Polsce, pod kątem ich rynkowego charakteru. Badanie uwzględnia specyfikę okresu przed i po implementacji „ustawy antyspreadowej" z 2011 r. oraz po uwolnieniu kursu franka szwajcarskiego przez Szwajcarski Bank Narodowy (SNB) w 2015 r.

Kredyty hipoteczne denominowane lub indeksowane do CHF, popularne w Polsce ze względu na atrakcyjne warunki oprocentowania, generowały również ryzyko kursowe dla kredytobiorców. Ryzyko to zmaterializowało się w 2008 r. wraz z wybuchem globalnego kryzysu finansowego, który skutkował znaczącym umocnieniem się franka szwajcarskiego w kolejnych latach. Przyczyną takiego stanu rzeczy był fakt, że waluta szwajcarska reprezentuje tzw. bezpieczną przystań dla inwestorów w czasach kryzysów, pojawiających się cyklicznie na rynkach.

W artykule podjęto próbę identyfikacji i oceny wpływu czynników regulacyjnych (w postaci „ustawy antyspreadowej") oraz zdarzeń o charakterze makroekonomicznym (uwolnienie kursu franka przez SNB) na kształtowanie się kursów sprzedaży CHF/PLN, a tym samym na sytuację kredytobiorców posiadających zobowiązania hipoteczne indeksowane do tej waluty. Poza tym przeprowadzono ocenę strategii kształtowania marż przez wybrane banki w kontekście ich konkurencyjności.

Celem niniejszego badania jest porównanie i ocena kursów sprzedaży franka szwajcarskiego (CHF/PLN), oferowanych kredytobiorcom przez wybrane banki działające w Polsce, w kontekście kształtowania marż i zachowania się rynku Forex. Weryfikacji poddano hipotezę, iż kursy sprzedaży CHF stosowane przez wybrane banki do rozliczania rat kapitałowo-odsetkowych kredytów hipotecznych denominowanych lub indeksowanych do CHF, charakteryzowały się zmiennością skorelowaną z rynkiem Forex oraz zbliżonym poziomem marż kształtowanych w kontekście regulacji i zdarzeń makroekonomicznych, co może świadczyć pośrednio o konkurencyjnym, a co za tym idzie rynkowym charakterze, biorąc pod uwagę podmioty z sektora bankowego.

W badaniu wykorzystano dane udostępnione przez następujące instytucje bankowe, oferujące kredyty denominowane lub indeksowane do CHF: ING Bank Śląski S.A., mBank S.A., BNP Paribas Bank Polska S.A., Pekao S.A., PKO BP S.A. oraz Santander Bank Polska S.A. Analizie poddano także dane historyczne dotyczące kursów wymiany CHF/PLN w okresie od 2006 do 2023 r., uzyskane z platformy transakcyjnej Forex. Artykuł składa się z opisu problematyki, analizy literatury, opisu danych oraz metod, wyników badań oraz podsumowania.

2. Kredyty hipoteczne rozliczane w CHF a kurs CHF/PLN

W niniejszym artykule podjęto problematykę kredytów hipotecznych denominowanych lub indeksowanych do franka szwajcarskiego (CHF), oferowanych przez wybrane banki w Polsce w pierwszej dekadzie XXI w. Kredyty te zawierały klauzule umowne, które zobowiązywały kredytobiorców do zakupu waluty kredytu w banku. Praktyka ta była powszechna do czasu uznania tych zapisów za abuzywne na mocy „ustawy antyspreadowej" z dnia 29 lipca 2011 r. Ustawa ta umożliwiła kredytobiorcom zawarcie bezpłatnego aneksu z bankiem, pozwalającego na spłatę zobowiązania bezpośrednio w CHF, co z kolei wygenerowało dodatkowy popyt na walutę szwajcarską na rynku detalicznym, którą kredytobiorcy kupowali i przelewali na konta walutowe w bankach.

Obowiązek zakupu waluty w instytucji udzielającej kredytu zrodził wśród kredytobiorców wątpliwości co do rynkowego charakteru oferowanych kursów wymiany CHF/PLN, a w konsekwencji przekonanie o ich zawyżaniu. Zarzut ten jest często podnoszony w pozwach sądowych, składanych przez kredytobiorców przeciwko bankom.

W artykule analizowane są przyczyny i konsekwencje stosowania klauzul walutowych, które nakazywały kredytobiorcom kupować franki szwajcarskie po kursie ustalanym przez bank. Autorzy starają się odpowiedzieć na pytanie, czy kursy te były zgodne z realiami rynkowymi, czy też banki wykorzystywały swoją pozycję, aby narzucać kredytobiorcom niekorzystne warunki wymiany walut.

Kredyty denominowane lub indeksowane do walut obcych, w tym CHF, oferowały konsumentom szereg korzyści, które przyczyniły się do ich popularności. Przede wszystkim, oprocentowanie tych kredytów było często niższe niż kredytów w złotych polskich. Przekładało się to na niższe raty, co z kolei zwiększało dostępność kredytów dla osób o niższych dochodach. Dodatkowo, niektórzy kredytobiorcy postrzegali kredyty rozliczane w walutach obcych jako formę spekulacji walutowej, licząc na deprecjację wybranej waluty (np. franka szwajcarskiego) i w konsekwencji obniżenie realnej wartości spłacanych rat.

Należy jednak zaznaczyć, że korzyści płynące z kredytów rozliczanych w walutach obcych wiązały się również z ryzykiem, wynikającym z wahań kursów. Kredytobiorcy, którzy zaciągnęli kredyty w obcej walucie, byli narażeni na ryzyko wzrostu rat kredytu w przypadku osłabienia się złotego względem tej waluty. Zjawisko to miało istotny wpływ na sytuację finansową wielu polskich rodzin, szczególnie po znaczącym wzroście kursu franka szwajcarskiego w 2015 r.

Uwolnienie kursu franka szwajcarskiego przez Szwajcarski Bank Narodowy (w styczniu 2015 r. wywarło istotny wpływ na kształtowanie się marż kursowych oferowanych przez banki.

W okresie poprzedzającym to wydarzenie, SNB, prowadząc interwencje na rynku walutowym, utrzymywał kurs franka na relatywnie niskim poziomie. W tym czasie, banki działające w Polsce oferowały klientom kredytów hipotecznych mniej korzystne marże, które były zawarte w kursach walutowych związanych z CHF.

Po uwolnieniu kursu, frank szwajcarski uległ gwałtownemu umocnieniu w stosunku do innych walut, w tym również do polskiego złotego. W odpowiedzi na kolejny znaczący wzrost kursu franka Związek Banków Polskich (ZBP) podjął inicjatywę mającą na celu złagodzenie problemu kredytów walutowych, proponując istotne zmniejszenie spreadu walutowego na okres 6 miesięcy. Propozycja ta została zaakceptowana przez 11 najważniejszych banków działających w Polsce.

Kurs waluty płynnej jest kształtowany przez mechanizm popytu i podaży, na który wpływają czynniki związane z parytetami rynkowymi oraz równowagą bilansu płatniczego. Kursy walutowe, prezentowane w tabelach kursowych banków, są determinowane przez szereg czynników, jednak zasadniczo banki bazują na aktualnych kursach walutowych obowiązujących na rynku Forex. Działając jako pośrednicy w obrocie walutami, banki dodają do kursów Forex marżę kupna (wartość ujemna) i sprzedaży, która stanowi ich źródło przychodu. Poziom marży, ustalany przez banki, może być determinowany przez kilka czynników, takich jak: poziom konkurencyjności, polityka wewnętrzna i koszty działalności oraz relacje z klientami. Banki mogą stosować różne kursy walutowe w zależności od rodzaju transakcji (np. transakcje gotówkowe, transakcje bezgotówkowe, transakcje o dużej wartości). W związku z powyższym wysokość stosowanego spreadu zależy od wielu czynników, takich jak rodzaj waluty, płynność rynku walutowego oraz indywidualna polityka cenowa banku.

Spread na kursie CHF, oferowanym przez banki w badanym okresie, ulegał zmianom, na które wpływało wiele czynników. Przede wszystkim należy podkreślić, że spread bankowy jest powiązany ze spreadem na rynku międzybankowym, gdzie banki dokonują transakcji kupna i sprzedaży walut między sobą. Zatem zmiany podaży i popytu na CHF na rynku międzybankowym mogą wpływać na zmiany spreadu. Banki mogą również dostosowywać swoje spready w zależności od sytuacji panującej na rynku oraz prowadzonej polityki. Konkurencja między bankami w zakresie wysokości spreadów może prowadzić do ich obniżania. W okresach wzmożonej konkurencji banki mogą oferować niższe marże, aby przyciągnąć klientów. Kolejnym istotnym czynnikiem jest ryzyko kursowe, czyli ryzyko zmiany kursu w przyszłości. W okresach podwyższonej zmienności kursu, spread może ulec poszerzeniu, ponieważ banki dążą do zabezpieczenia się przed potencjalnymi stratami wynikającymi z wahań kursowych.

Istnieje kilka powodów, dla których banki konkurują spreadami. W dobie łatwego dostępu do informacji, klienci mogą szybko porównać marże w różnych bankach i wybrać ten, który oferuje najlepszy kurs. Chociaż niższe spready oznaczają mniejszy zysk na każdej transakcji, banki mogą zrekompensować to zwiększoną liczbą transakcji. Większa liczba transakcji może również prowadzić do zwiększenia innych źródeł dochodu, np. opłat za przelewy.

Uruchomienie kantorów internetowych mogło mieć znaczący wpływ na wysokość spreadów na rynku walutowym. Kantory internetowe wprowadziły dużą konkurencję na rynek wymiany walut, co zmusiło tradycyjne banki do obniżenia swoich marż. Kantory internetowe oferują konkurencyjne kursy walutowe, co pozwala klientom na łatwe porównanie ofert różnych kantorów i wybór naj-korzystniejszej opcji. W przeszłości klienci banków mogli być narażeni na niekorzystne kursy walutowe, ponieważ banki nie zawsze były transparentne w kwestii spreadów, a konkurencja na rynku była niewystarczająca. Kantory internetowe mają niższe koszty operacyjne niż tradycyjne banki, co pozwala im oferować niższe marże. Jest to możliwe, ponieważ kantory internetowe nie posiadają fizycznych oddziałów i zatrudniają mniej personelu. Kantory internetowe są dostępne 24 godziny na dobę, 7 dni w tygodniu, co ułatwia klientom wymianę walut w dogodnym dla nich czasie. Dodatkowo stale wprowadzają innowacje w zakresie swoich usług, co ma na celu dalsze obniżenie spreadów i ułatwienie klientom wymiany walut. Jednak należy pamiętać, że kantory internetowe nie są pozbawione wad. Jedną z nich jest brak możliwości osobistego kontaktu z doradcą, co może być problematyczne dla niektórych klientów. Ponadto kantory internetowe mogą być bardziej podatne na cyberataki niż tradycyjne banki. Ogólnie rzecz biorąc, uruchomienie kantorów internetowych miało pozytywny wpływ na rynek walutowy ponieważ zwiększyła się konkurencja, transparentność, obniżyły koszty oraz pojawiły się ułatwienia w wymianie walut.

Oprócz pojawienia się na rynku kantorów internetowych, na wysokość marż mogły mieć wpływ również inne czynniki, takie jak płynność rynku (im wyższa płynność, tym niższe marże), popularność waluty (im więcej transakcji na danej walucie, tym niższe marże) i sytuacja makroekonomiczna. Czynniki makroekonomiczne, takie jak stopy procentowe czy inflacja, mogą również wpływać na zmienność spreadów.

Kurs można nazwać rynkowym gdy jest swobodnie ustalany przez rynek, a nie organy Państwa i nie ma na nim ograniczeń w związku z obrotem daną walutą. O rynkowości kursu świadczy jego korelacja z rynkiem Forex w odniesieniu do zmian jakie na nim zachodzą, a marże są ustalane na konkurencyjnych zasadach. Marża banku ma charakter rynkowy, jeżeli nie odbiega od marży średniej oferowanej przez inne podmioty na rynku i zmienia się tak, jak marże na rynku. Należy przy tym podkreślić, że informacje o marżach stosowanych przez inne niż banki podmioty oferujące obrót walutami są trudnodostępne, skupiono się zatem na danych z rynku bankowego. Rynkowy charakter kursu ma zatem atrybuty, które należy poddać analizie: reakcję na zmiany na Forex, czynniki systemowe lub makroekonomiczne oraz konkurencyjność marży.

3. Przegląd literatury

W pierwszej kolejności należy przybliżyć aspekty historyczne, związane z kredytami denominowanymi lub indeksowanymi do waluty szwajcarskiej. W Australii, pionierskie wdrożenie kredytów walutowych na rynku konsumenckim miało miejsce na początku lat 80. XX w. Głównym motorem popularności tego produktu finansowego była istotna różnica w poziomach stóp procentowych. W tamtym okresie oprocentowanie kredytu w dolarach australijskich (AUD) oscylowało wokół 13%, podczas gdy w przypadku franka szwajcarskiego (CHF) kształtowało się na poziomie około 7%. Atrakcyjne warunki kredytowania w CHF okazały się jednak problematyczne dla wielu dłużników w 1985 r., kiedy to dolar australijski gwałtownie stracił na wartości. Spowodowało to drastyczny wzrost zadłużenia osób spłacających kredyty we franku szwajcarskim. W konsekwencji, wielu kredytobiorców stanęło w obliczu widma niewypłacalności, co do-prowadziło do lawiny procesów sądowych przeciwko bankom. Podobne problemy związane z kredytami walutowymi wystąpiły również we Włoszech na początku lat 90. XX w., co również stanowi przykład nieodpowiedzialnej praktyki bankowej i nadmiernego ryzyka podejmowanego przez kredytobiorców (Rynio, 2020: 148–153). Niestety, pomimo tych do-świadczeń, ani decydenci, ani konsumenci w Polsce nie wyciągnęli wystarczających wniosków, co w konsekwencji doprowadziło do kryzysu kredytowego, związanego z kredytami frankowymi.

Rynek finansowy, który ma istotny wpływ na rozwój rynku nieruchomości, stanowi także istotny wkład w kształtowanie polityki społecznej. Michał Buszko (2014: 27–43) zanotował, że w latach 2005–2009 polski rynek nieruchomości przeżywał gwałtowny wzrost, podczas którego sprzedaż nieruchomości gwałtownie rosła, a wraz z nią popularność kredytów denominowanych lub indeksowanych w szwajcarskich frankach. W tamtym czasie złoty zyskiwał na wartości względem franka, a to dodatkowo zachęcało do zaciągania kredytów w tej walucie, ponieważ spłata w przyszłości miała być nawet tańsza zgodnie z oczekiwaniami kredytobiorców. Frank szwajcarski postrzegany był jako waluta o dużej stabilności, co miało stanowić zabezpieczenie przed inflacją i wahaniami kursu złotego. Dodatkowo kredyty walutowe pozwalały na uzyskanie wyższej zdolności kredytowej, co umożliwiało zakup droższych nieruchomości. Niektóre banki oferowały kredyty frankowe na 100% wartości nieruchomości, co eliminowało konieczność posiadania wkładu własnego. Kredyty frankowe można było zaciągać na okres do 30 lat, co rozkładało raty na dłuższy czas i czyniło je bardziej przystępnymi. Dla banków kredyty frankowe również były atrakcyjne, zarabiały one bowiem dodatkowo na spreadzie walutowym i mogły oferować opcjonalne lub obowiązkowe ubezpieczenia np. niskiego wkładu własnego, co generowało dodatkowe zyski, a [poza tym dość często marże na kredyty frankowe były wyższe niż na kredyty w złotych. W rezultacie tych czynników kredyty frankowe stały się dominującą formą finansowania zakupu nieruchomości w Polsce w tamtym okresie. Niestety, ta popularność miała negatywne konsekwencje w późniejszych latach, gdy kurs franka gwałtownie się umocnił, co doprowadziło do znacznego wzrostu rat kredytów i problemów finansowych dla wielu kredytobiorców (Buszko, 2014: 27–43).

W związku z prowadzonymi badaniami należy zauważyć, że 15 stycznia 2015 r., ku zaskoczeniu rynków, Szwajcarski Bank Narodowy (SNB) zdecydował się znieść dolną granicę kursu euro, wynoszącą 1,20 CHF, wprowadzoną 6 września 2011 r. W ciągu 40 miesięcy obowiązywania kursu minimalnego, SNB musiał interweniować tylko przez około 4 miesiące, aby utrzymać dolną granicę i uniemożliwić wzrost wartości franka szwajcarskiego w stosunku do euro (Bernholz, 2015). Ta nieoczekiwana zmiana w prowadzeniu polityki związanej z kursem CHF wpłynęła na dalsze umocnienie się waluty szwajcarskiej, a co za tym idzie wysokość rat kredytów spłacanych przez klientów banków.

Badania związane z kursami walut, w tym dotyczące relacji CHF/PLN prowadzone były na polskim rynku w odniesieniu do ofert niektórych banków, co stanowi fundament podjętych w niniejszym artykule analiz. Michał Grudziński (2017: 427–438) zbadał marże 8 banków oferujących franka szwajcarskiego, dolara amerykańskiego i euro w latach 2009–2016. Wyniki analiz pokazały, że w latach 2009–2014 nastąpił wzrost marż, a od 2015 r. zaobserwowano zmniejszenie się marży stosowanej na kursie franka szwajcarskiego przy jednoczesnym wzroście marż stosowanych na kursach dolara amerykańskiego i euro.

Jednym z kluczowych ryzyk dla kredytobiorców są marże i ich wysokość przy rozliczaniu spłacanych w złotówkach rat kapitałowo-odsetkowych udzielonych w walucie obcej, co zostało opisane przez Marcina Kalinowskiego (2011: 461–472). W kontekście kryzysu finansowego okazało się, że spready zaczęły być znaczącym źródłem przychodów instytucji finansowych, a także obciążeniem dla kredytobiorców, szczególnie gdy waluta szwajcarska uległa umocnieniu. Magdalena Paleczna i Edyta Rutkowska-Tomaszewska (2018: 39–56) odniosły się do uprawnień kredytobiorcy zaciągającego kredyt denominowany lub indeksowany do waluty innej niż polska w świetle ustawy „antyspreadowej", zauważając, że banki miały swobodę w wyznaczaniu wysokości spreadów. Swoboda ta mogła prowadzić do nadużyć, na co należy zwrócić uwagę w podejmowanych analizach. Ewa Kowalewska (2017: 485–495) stwierdziła z kolei, że banki nie powinny ustalać kursu obowiązującego w danej umowie w sposób, który byłby niejasny i stanowiłby naruszenie dóbr kredytobiorcy, co miało miejsce w wielu przypadkach podpisywanych umów kredytowych, nieprecyzujących sposobu i wysokości marży związanej z oferowanymi kursami kupna i sprzedaży. Marek Radzikowski (2018: 101–115) zauważył, że jednym z problemów jest to, iż spready znacząco różniły się pomiędzy bankami. Istniały przesłanki, że niektóre banki stosowały wyższe spready dla swoich klientów niż inne. Należy jednak zaznaczyć, że wiele banków charakteryzujących się wysokimi spreadami miało jednocześnie niskie marże na udzielanych kredytach.

Istotnym czynnikiem wpływającym na wysokość spreadu jest konieczność pokrycia kosztów transakcji wymiany walut oraz zabezpieczeń. Do tej listy należy również dopisać wspomniane wcześniej ogólne koszty działalności banku, które mogą się znacząco różnić w zależności od instytucji. Niektóre banki, zwłaszcza te z polskim kapitałem właścicielskim, nie miały dostępu do tanich pożyczek od zagranicznych podmiotów macierzystych i z tego powodu były zmuszone do korzystania z droższych, alternatywnych sposobów pozyskiwania franków szwajcarskich, co mogło przełożyć się na politykę marż w oferowanych kursach walutowych. Należy tutaj podkreślić, że strategie rentowności stosowane przez banki są zróżnicowane. Niektóre instytucje, szczególnie te o ugruntowanej pozycji na rynku, mogą pozwolić sobie na niższą rentowność, ale inne banki nie mają takiej możliwości. Warto również wspomnieć, że spready podlegały zmianom w czasie. Wynikało to przede wszystkim ze znacznego wzrostu popytu na franki szwajcarskie, szczególnie po 2008 r. Spowodowało to zmniejszenie dostępności i wzrost ceny tej waluty, co przełożyło się na wyższe spready.

Marcin Gadomski (2012: 25–38) stwierdził w swoich badaniach, że wyższa marża oraz dochód ze spreadu kredytowego z nawiązką rekompensują wyższy koszt ryzyka kredytów walutowych. Ryszard Szewczyk (2017: 451–462) z kolei zauważył, że w dewizowych transakcjach z podmiotami niebankowymi, spready bankowe nie są zazwyczaj większe niż 5–6% kursu kupna, natomiast w transakcjach gotówkowych, które wiążą się z wyższymi kosztami, mogą dochodzić nawet do 12–13% kursu kupna. Oskar Kwiatkowski (2022: 134–150) przedstawił pogląd na definicję kursu walutowego, który określa wartość jaką uczestnicy rynku są w stanie zapłacić za walutę, kurs rynkowy powinien być bazą do obliczania kursu sprzedaży i kupna.

Kredyty frankowe i związane z nimi problemy wpłynęły na wzrost znaczenia zagadnienia zadłużania się gospodarstw domowych, który nastąpił po uwolnieniu kursu franka szwajcarskiego (Jagoda i Kryska, 2016: 98–106). Na rynku walutowym, a szczególnie w przypadku pary walutowej CHF/PLN, mieliśmy do czynienia z rzadkimi zjawiskami determinowanymi decyzjami Szwajcarskiego Banku Narodowego (SNB). Modele stochastyczne mogą odzwierciedlać te zjawiska jedynie w przybliżeniu, a z drugiej strony zastosowanie modeli przyczynowych nie jest możliwe, ponieważ rynek nie posiada szczegółowych informacji o procesach decyzyjnych banku ani innych podmiotów. Być może takie modele mogłyby pokazywać trendy, ale ponieważ w procesie estymacji zwykle przypisuje się jednakową wagę poszczególnym momentom w czasie, punktowa prognoza nagłych zmian wydaje się niemożliwa (Bukietyńska i Czekała, 2016: 203–210).

Oprócz analiz prowadzonych przez polskich autorów, analizujących problem kredytów związanych z CHF oraz kształtowanie się kursów CHF/PLN, w piśmiennictwie zagranicznym można znaleźć badania dotyczące franka szwajcarskiego w relacji do innych walut, a także próby modelowania jego kursu w obliczu decyzji SNB o kontroli kursu. Mathias Hoffman i Rahel Suter (2010: 349–371) dokonali analizy roli czynników globalnych i specyficznych dla danego kraju w kształtowaniu kursu franka szwajcarskiego w latach 1990–2009. Stwierdzili, że frank szwajcarski zachowuje się jak „bezpieczna przystań" w okresach globalnych zawirowań gospodarczych. Siła wpływu czynników globalnych na kurs franka szwajcarskiego różni się w zależności od par walutowych i czasu. Na przykład, podczas kryzysu finansowego z lat 2007–2008 czynnik globalny miał duży wpływ na kurs franka w stosunku do jena, funta i dolara kanadyjskiego, ale mniejszy w stosunku do dolara amerykańskiego. W ciągu ostatnich dziesięciu lat nie odnotowano niemal żadnej ekspozycji globalnej w bilateralnym kursie EUR/CHF. Ekspozycja na czynniki globalne różni się w zależności od par walutowych. Na przykład, kurs franka szwajcarskiego w stosunku do jena jest bardzo wrażliwy na wahania warunków globalnych. Badanie pokazało, że czynniki globalne miały duży i trwały wpływ na poziom kursu wymiany franka szwajcarskiego, co prowadziło do jego wyższej średniej wyceny w stosunku do koszyka innych walut. Wrażliwość ekspozycji na czynniki globalne w odniesieniu do zmian w różnicy stóp procentowych różni się w zależności od walut. Analiza ta sugeruje, że właściwości „bezpiecznej przystani" są cechą poszczególnych par walutowych, a nie indywidualnej waluty.

Tommaso Mancini Griffoli i in. (2015: 299–331) stwierdzili, że relatywne wydatki rządowe i relatywne *terms of trade* są głównymi czynnikami wpływającymi na realny kurs franka szwajcarskiego w długim okresie. PKB per capita i aktywa zagraniczne netto mają istotne znaczenie, ale tylko w przypadku uwzględnienia pary walutowej JPY/CHF w panelu. Autorzy podkreślają, że ich wyniki są wrażliwe na wybór zmiennych objaśniających, krajów uwzględnionych w panelu i analizowany okres.

Christian Grisse i Thomas Nitschka (2013: 1–24) przedstawili charakterystykę franka szwajcarskiego jako „bezpiecznej przystani" w kontekście wahań kursów walutowych. Autorzy zbadali związek między stopami zwrotu z franka szwajcarskiego a czynnikami ryzyka. Wyniki badań pokazują, że frank szwajcarski wykazuje cechy „bezpiecznej przystani" w stosunku do wielu, ale nie wszystkich walut, wzmacniając się w okresach wzrostu globalnego ryzyka wobec niektórych walut (np. euro), a osłabiając wobec innych (np. dolara amerykańskiego). Kluczowym wnioskiem jest istotna zmienność w czasie związku między stopami zwrotu franka, a czynnikami ryzyka, przy czym zależność ta staje się silniejsza w okresach kryzysowych. Jessica Leutert (2018: 1–21) zbadała premię za bezpieczeństwo franka szwajcarskiego, wykorzystując metodologię opartą na modelu wyceny aktywów (CAPM). Autorka zbadała, czy frank szwajcarski, postrzegany jako „bezpieczna przystań", rzeczywiście generuje premię dla inwestorów, i spróbowała oszacować jej wielkość oraz zmienność w czasie. Artykuł podkreśla zmienność premii w czasie oraz jej znaczenie w okresach kryzysów, potwierdzając rolę franka szwajcarskiego jako „bezpiecznej przystani".

Markus Hertrich (2022: 450–489) badał wpływ interwencji na rynku walutowym na utrzymanie minimalnego kursu wymiany, posługując się przykładem Szwajcarskiego Banku Narodowego i jego polityki wobec euro w latach 2011–2015. Artykuł przedstawia model teoretyczny, który opisuje zachowanie kursu walutowego w sytuacji, gdy władze monetarne kraju zobowiązują się do utrzymania minimalnego kursu. Samuel Reynard (2009: 335–363) z kolei analizował interwencje na rynku walutowym w kontekście reżimu minimalnego kursu wymiany. Autor przedstawił model teoretyczny, który uwzględnia te interwencje podejmowane w celu utrzymania minimalnego kursu. Model ten może być użyteczny dla władz monetarnych do monitorowania ryzyka związanego z utrzymaniem minimalnego kursu wymiany. Wyniki empiryczne potwierdzają, że model dobrze opisuje zmiany na rynku. Można zatem oczekiwać, że w obliczu kolejnych decyzji związanych z regulowaniem kursu franka, zaprezentowane modele pozwolą przewidzieć skutki takich interwencji, czego nie udało się zrobić wcześniej. Cho-Hoi Hui, Chi-Fai Lo i Chi-Hei Liu (2022: 1–18) modelowali politykę interwencji na rynku walutowym przy użyciu procesu Rayleigha, stosując ten model do analizy dynamiki kursu franka szwajcarskiego. Model opisany przez nich uwzględnia asymetryczny charakter interwencji oraz ich wpływ na zmienność i średni poziom kursu walutowego. Badanie empiryczne potwierdza, że model ten dobrze sprawdza się w praktyce, na przykładzie interwencji Szwajcarskiego Banku Narodowego.

Analiza kursów przedstawiona w poniższym badaniu pozwoli na określenie zachowania się kursów oferowanych przez banki i udzielenie odpowiedzi na pytanie badawcze dotyczące rynkowości kursów w oparciu o wcześniej zaprezentowane wyniki badań.

4. Dane i metoda badawcza

Do analizy wykorzystano kursy sprzedaży CHF/PLN pochodzące z portalów głównych banków działających Polsce, które wiodły prym w zakresie udzielania kredytów hipotecznych tj.: ING Bank Śląski S.A., mBank S.A., BNP Paribas Bank Polska S.A. (Bank ten przejął Raiffeisen Bank Polska S.A.), Pekao SA, PKO BP S.A., Santander Bank Polska S.A. (Bank ten przejął Bank Zachodni WBK S.A.) oraz kursy Forex w latach 2006–2023. Kurs Forex, który posłużył do analizy porównawczej spreadów jest kursem rynkowym, pozbawionym marży pośrednika.

Analizę przeprowadzono w środowisku programistycznym Python, wykorzystując szereg bibliotek i metod statystycznych w celu zbadania zmienności kursów walut oraz oceny rozkładów marż stosowanych przez banki. Dane zbierane z portali internetowych banków pozyskano w oparciu o biblioteki *requsts* i *BeautifulSoup*. Analizę statystyczną przeprowadzono w oparciu o bibliotekę *scipy* wraz modułami *stats* i *optimize* oraz bibliotekę *statsmodels*. Do przetwarzania danych wykorzystano pakiety *NumPy* oraz *Pandas*, wizualizację zaś zrealizowano wykorzystując bibliotekę *Seaborn*.

5. Wyniki badań

Na wykresie 1 pokazano zachowanie analizowanych kursów sprzedaży CHF/PLN na przestrzeni lat 2006–2023. Zmiany kursów oferowanych przez badane instytucje w porównaniu z kursem rynkowym Forex pokazują jednolity trend w ich zachowaniu.

Wykres 1

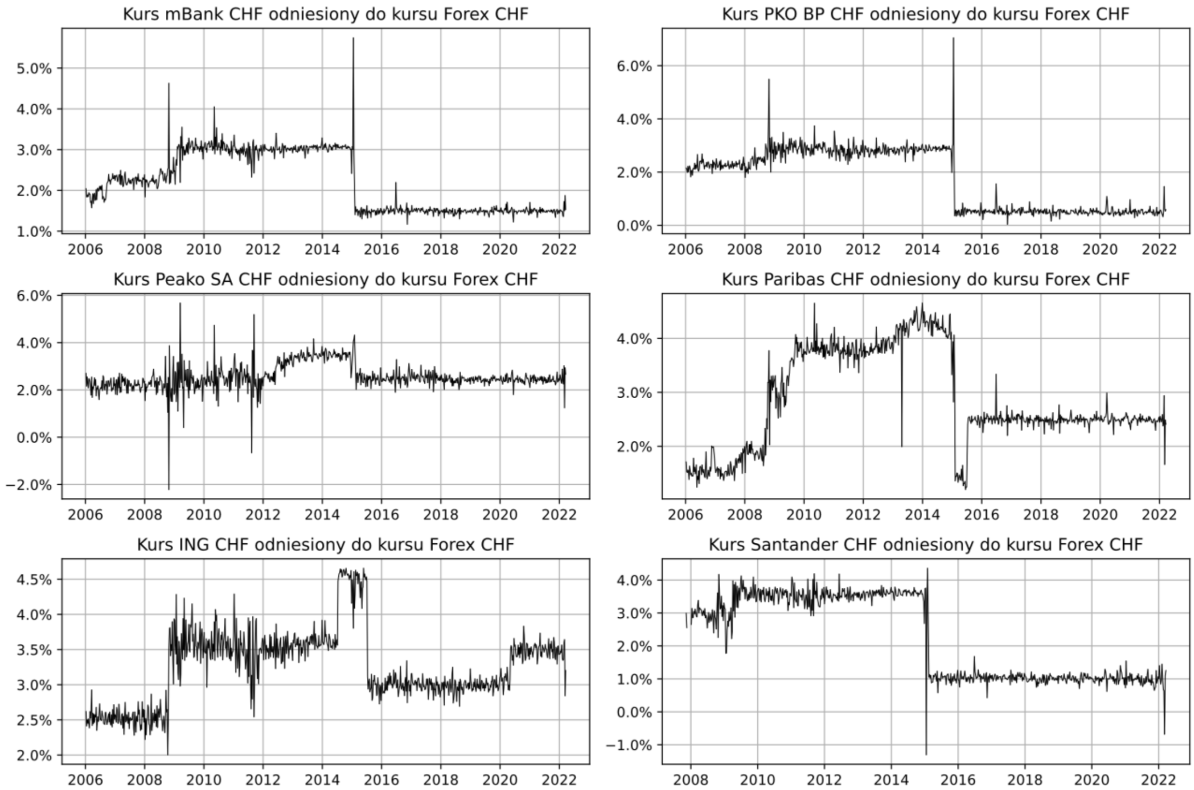
Kursy sprzedaży Banków CHF/PLN i kursy Forex

Źródło: badania własne.

Na wykresie 1 widać, że kursy sprzedaży Banków i kursy Forex podążają za sobą, a dodatkowo kursy sprzedaży Banków są wyższe od Forex o doliczoną marżę sprzedaży. Na wykresie 2 przedstawiono kursy sprzedaży poszczególnych Banków odniesione do kursu Forex.

Wykres 2

Kursy sprzedaży Banków odniesione do kursu Forex



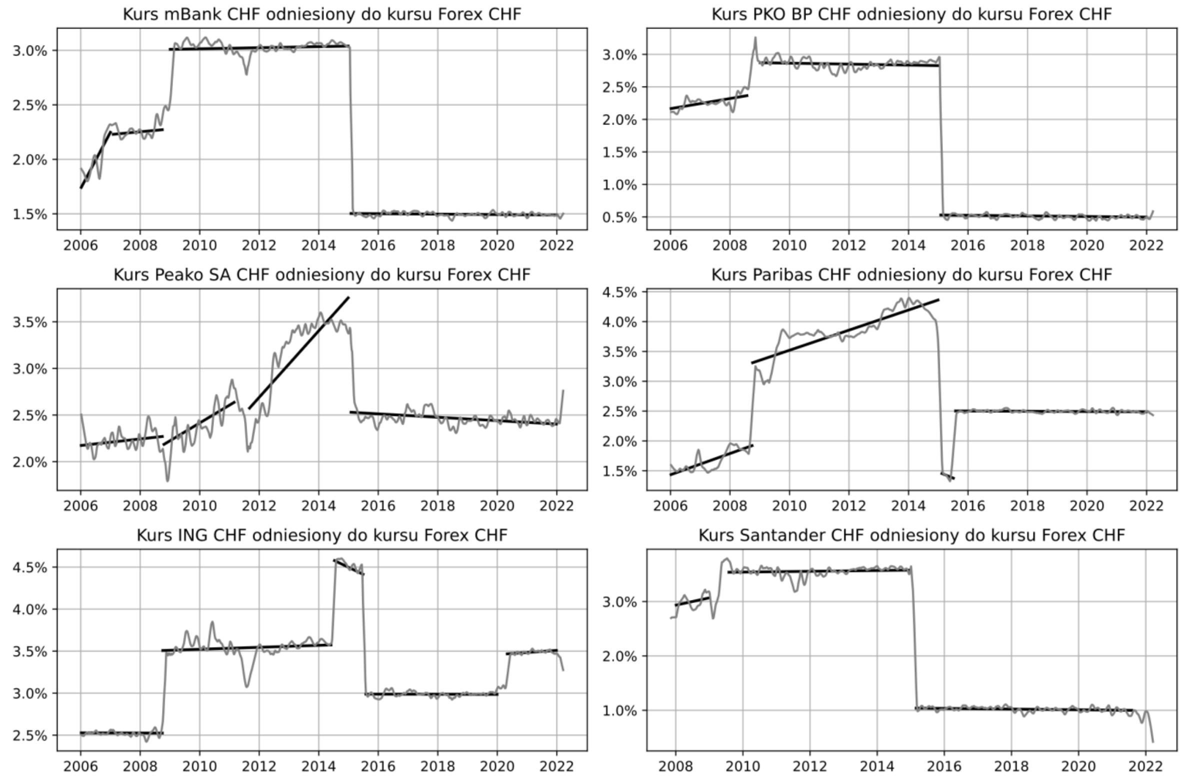
Źródło: badania własne.

Analizując wykresy dla poszczególnych Banków zaprezentowane na wykresie 2, można stwierdzić, o ile kurs banku był wyższy od kursu Forex w relacji względnej (procentowej, oznaczającej marżę względem kursu Forex).

Na wykresie 3 dodano linie regresji do wygładzonych wielomianowo wykresów zaprezentowanych na wykresie 2.

Wykres 3

Linie regresji dla kursów sprzedaży CHF w Bankach w odniesieniu do kursu Forex

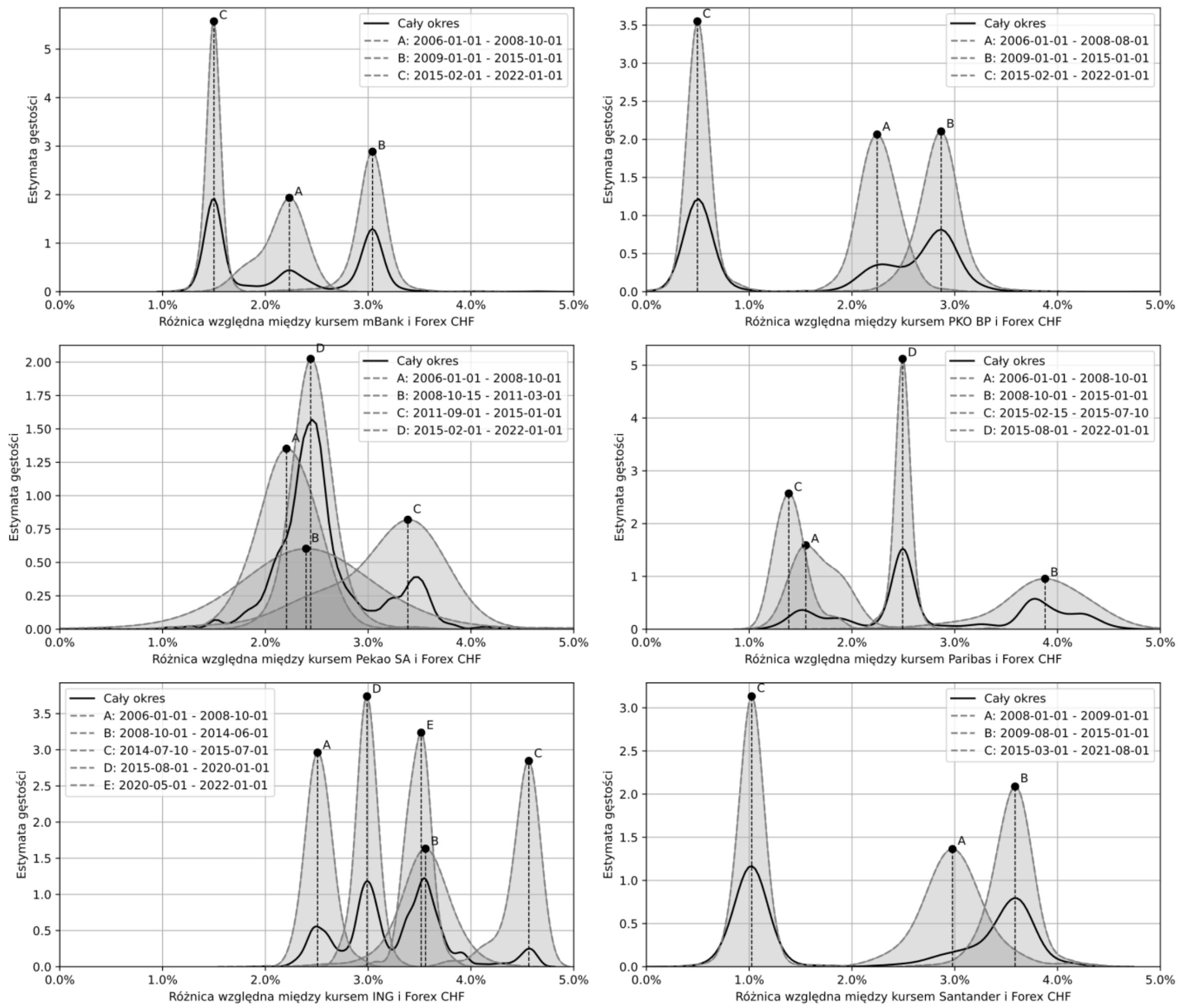


Źródło: badania własne.

Na wykresach dla poszczególnych Banków zaprezentowanych na wykresie 3 można zidentyfikować okresy, w których każdy z analizowanych Banków zmieniał swoje strategie związane z wysokością kształtowanych marż w kursach sprzedaży CHF/PLN. Na wykresie 4 przedstawiono estymaty gęstości dla względnych różnic między kursami sprzedaży CHF/PLN w analizowanych Bankach, a kursami Forex. Dodatkowo widać, że wszystkie z badanych Banków obniżyły marże w 2015 r., po uwolnieniu kursu franka przez SNB, ale w 2011 r., po wprowadzeniu „ustawy antyspreadowej", Banki zareagowały w zróżnicowany sposób.

Wykres 4

Estymaty gęstości rozkładu analizowanych kursów



Źródło: badania własne.

Estymaty gęstości rozkładu analizowanych kursów zaprezentowane na wykresie 4 pokazują zmienność poziomu wielkości marż w okresach, w których realizowane były poszczególne strategie Banków. W każdym z okresów wskazano dominantę, a szerokość rozkładu gęstości prawdopodobieństwa obrazuje poziom zmienności tej marży w danym okresie. Im większa szerokość, tym większa zmienność marż, co wiąże się z większym odchyleniem standardowym, które wskazuje na mniejszą stabilność powiązania kursu Banku z kursem Forex.

Wyniki badań nad rozkładami marż w kursach sprzedaży analizowanych Banków przedstawiono w tabeli 1.

Tabela 1

Zestawienie wyników analizy marż

Okres	Liczba obserwacji	Dominanta	Wartość oczekiwana	Odchylenie stdandardowe	Skośność	Kurtoza
mBank						
2006-01-01 2008-10-01	143	2,2383%	2,1600%	0,2014%	−0,7662	−0,0277
2009-01-01 2015-01-01	313	3,0436%	3,0242%	0,1645%	−0,6998	11,0373
2015-02-01 2022-01-01	361	1,4941%	1,4960%	0,0803%	2,6148	24,2874
PKO BP						
2006-01-01 2008-08-01	134	2,2494%	2,2655%	0,1741%	0,3177	1,0047
2009-01-01 2015-01-01	313	2,8740%	2,8495%	0,1910%	0,0634	3,3186
2015-02-01 2022-01-01	361	0,4894%	0,5134%	0,1213%	2,3384	17,3526
PKO SA						
2006-01-01 2008-10-01	143	2,1735%	2,2220%	0,2653%	0,4436	2,1091
2008-10-15 2011-03-01	124	2,3912%	2,4108%	0,7526%	−1,0975	13,3791
2011-09-01 2015-01-01	174	3,4281%	3,1652%	0,5248%	−0,8758	2,2169
2015-02-01 2022-01-01	361	2,4464%	2,4667%	0,2116%	2,3764	18,0827
Paribas						
2006-01-01 2008-10-01	143	1,5272%	1,6788%	0,2186%	0,7276	0,4857
2008-10-01 2015-01-01	326	3,8010%	3,8362%	0,4176%	−1,1861	2,5685
2015-02-15 2015-07-10	21	1,3900%	1,4148%	0,1498%	1,0735	1,3747
2015-08-01 2022-01-01	335	2,4923%	2,4960%	0,0901%	2,5778	25,3577
ING						
2006-01-01 2008-10-01	143	2,4838%	2,5261%	0,1223%	0,4912	0,9062
2008-10-01 2014-06-01	296	3,5632%	3,5406%	0,2591%	−1,2679	6,0016
2014-07-10 2015-07-01	51	4,5648%	4,4959%	0,1680%	−2,1658	5,0331
2015-08-01 2020-01-01	231	2,9904%	2,9866%	0,0993%	−0,0291	0,9895
2020-05-01 2022-01-01	87	3,5315%	3,4878%	0,1127%	−0,2413	1,5786
Santander						
2008-01-01 2009-01-01	52	2,9748%	3,0009%	0,3077%	0,8727	3,2595
2009-08-01 2015-01-01	283	3,6009%	3,5582%	0,1902%	−0,4569	2,7330
2015-03-01 2021-08-01	336	1,0277%	1,0197%	0,1247%	0,1149	4,5236

Źródło: badania własne.

Analiza kursów sprzedaży CHF/PLN oferowanych przez wybrane Banki w Polsce w różnych okresach pokazuje, że dominanty nie różnią się od średnich, a więc można mówić o rozkładach normalnych wysokości analizowanych marż. Na podstawie wyników powyższych analiz można stwierdzić konkurencyjność marż stosowanych przez wybrane do analizy Banki w kursach sprzedaży.

Podsumowanie

Omawiany problem kształtowania się kursów franka szwajcarskiego w Polsce odnosi się do okresu początku XXI w., kiedy wielu polskich kredytobiorców zaciągało kredyty hipoteczne indeksowane lub denominowane w tej walucie. Początkowo wydawało się to dla klientów banków atrakcyjne ze względu na niższe oprocentowanie w porównaniu do kredytów hipotecznych w złotówkach, jednak kryzys finansowy z 2008 r. i decyzja Szwajcarskiego Banku Narodowego o uwolnieniu franka w 2015 r. spowodowały gwałtowny wzrost wartości franka w stosunku do złotego. Wpłynęło to na znaczny wzrost miesięcznych spłat kredytów dla polskich kredytobiorców, a co za tym idzie kłopoty finansowe. Szacunki wskazują, że we frankach szwajcarskich denominowanych było od 700 tysięcy do 1 miliona umów kredytowych w Polsce. Oznacza to, że znaczna część polskich właścicieli nieruchomości boryka lub borykała się z trudnościami finansowymi. Wzrost wartości franka dramatycznie zwiększył niespłacone zadłużenie pożyczkobiorców, a zatem kredyt w wysokości 300 000 CHF w 2008 r. mógł podwoić się lub nawet potroić w przeliczeniu na PLN. Polski rząd podjął kilka kroków, aby spróbować złagodzić kryzys dla kredytobiorców[1]. Kryzys franka szwajcarskiego w dalszym ciągu stanowi poważny problem w Polsce, a wielu kredytobiorców nadal ma trudności z zarządzaniem swoim zadłużeniem. Kwestia kredytów hipotecznych denominowanych we frankach szwajcarskich w Polsce pozostaje poważnym wyzwaniem zarówno dla kredytobiorców, jak i systemu finansowego.

Powyższa analiza pozwoliła na ocenę tego, czy kursy sprzedaży, po których kredytobiorcy spłacali raty w głównych bankach oferujących kredyty hipoteczne w CHF miały charakter rynkowy. W wyniku przeprowadzonych badań zauważono, że kursy te były silnie skorelowane z kursem Forex, banki konkurowały marżami i dostosowywały je do warunków rynkowych,

[1] „Ustawa o pomocy pożyczkobiorcom frankowym" (2015): Ustawa ta umożliwiała kredytobiorcom przeliczanie kredytów hipotecznych w CHF na złote po historycznym kursie wymiany, ale uznano ją za częściowo niezgodną z konstytucją.

„Ustawa frankowiczowa" (2017): Ustawa ta wprowadziła mechanizm renegocjacji kredytów hipotecznych w CHF, umożliwiając sądom ich potencjalną konwersję na złote pod pewnymi warunkami. Banki nadal kwestionują to prawo, a batalia prawna trwa.

Rekomendacje i wytyczne: Komisja Nadzoru Finansowego (UKNF) wydała rekomendacje i wytyczne dla banków w zakresie kredytów hipotecznych w CHF, zachęcając je do oferowania kredytobiorcom korzystniejszych rozwiązań.

a dodatkowo kurs nie był regulowany przez Państwo. Banki, oprócz PKO SA nie zareagowały zmianą strategii na „ustawę antyspreadową" w 2011 r., jednak wszystkie badane banki na początku 2015 r. obniżyły marże na kursach sprzedaży CHF, ale nie wszystkie w takim samym stopniu. Na wysokość marż wpływ mógł mieć także rozwój kantorów internetowych.

Zweryfikowano pozytywnie hipotezę, iż kursy sprzedaży CHF stosowane przez wybrane banki do rozliczania rat kapitałowo-odsetkowych kredytów hipotecznych denominowanych lub indeksowanych do CHF, charakteryzowały się zmiennością skorelowaną z rynkiem Forex oraz zbliżonym poziomem marż kształtowanych w kontekście regulacji i zdarzeń makroekonomicznych, co może świadczyć pośrednio o konkurencyjnym, a co za tym idzie rynkowym charakterze kursu, biorąc pod uwagę grupę badawczą. Kolejne badania powinny dotyczyć innych par walut i oceny ich rynkowego charakteru.

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DERISKING THE RISK: WAYS AND MEANS FINANCING VERSUS AUSTERITY MEASURES IN MANAGEMENT OF FISCAL IMBALANCES IN NIGERIA

ABSTRACT

The purpose of the article. The study analyses two prominent fiscal adjustment measures – Ways and Means financing, and austerity measures – to determine the most appropriate strategy for managing fiscal imbalances and economic crisis in Nigeria.

Methodology. Documentary research design was used as the methodology. Data was derived from reports and publications of government agencies. Data analysis was done using mixed methods content analysis.

Results of the research. Findings of the study highlighted that Ways and Means financing is justified since it provides the government with short-term funding to cover budgetary deficits. Nevertheless, if Ways and Means is applied without caution, it is likely to induce unchecked spending and money supply surges, resulting in inflation and currency devaluation. The study maintained that fiscal austerity, which advocates a policy of significant decrease in government deficits and stabilization of government debt through either tax hikes, spending cutbacks, or both, is a more effective measure in managing fiscal imbalances in Nigeria.

Keywords: austerity measures, fiscal deficits, fiscal imbalance, public debts, Ways and Means.

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Introduction

Beginning in the late 2000s, the economic crisis caused public deficit and debt to rise at an unprecedented rate, particularly in several European nations (Campoy-Munoz et al., 2022). Countries faced significant medium- and long-term fiscal concerns. Advanced economies' average national deficits increased from 3.9% of Gross Domestic Product (GDP) in 2008 to a peak of 8.3% in 2010. In industrialized economies, general government debt increased from 80% of GDP in 2008 to more than 107% in 2014 (International Monetary Fund [IMF], 2014). Twenty-five Organization for Economic Co-operation and Development (OECD) countries adopted plans to implement fiscal consolidation totalling about 6% of GDP from 2009 to 2013 as a result of these growing deficits and debt (Marcel, 2014; Posner, 2015).

The effects of the Great Recession on fiscal policy have been profound. Since budgeting is hampered by nearly unprecedented fiscal ambiguity, both pressures call for fiscal austerity and support growth and stimulus to boost stagnant economies. For democratic countries and their leaders, the upcoming decades will provide daunting difficulties. Most countries' deficits and debt have reached near-record levels, and even with the recovery from the crisis, there will be large budgetary gaps that need to be filled. In addition to the fiscal imbalances that result, countries will also have to deal with long-term fiscal constraints brought on by aging populations and growing health care costs. The return of robust growth, in contrast to past recessions, will pave the way for even more challenging and painful decisions rather than closing the fiscal gaps that these countries are currently facing. Eventually, a balance between short-term growth and long-term fiscal consolidation will be necessary for national economies to remain sustainable. It is currently being questioned if such measures are politically and economically viable (Posner, 2015).

To control budget deficits, numerous governments have been enacting significant fiscal reforms in the years since the global financial crisis. These actions were carried out in response to growing worries about either the public debt or solvency challenges in general. According to Reinhart et al. (2011) and Reinhart and Sbrancia (2015), policymakers may have had no other choice as sovereign yield spreads in several nations began to rise by 2010. However, many analysts began to doubt the rationality of these actions because financial market circumstances continued to worsen and growth performance in the ensuing years was poor (Born et al, 2014).

Governments usually implement fiscal reforms in reaction to economic crisis, which frequently necessitates the utilization of fiscal adjustment measures in the years that follow. The impact of fiscal adjustment measures on output has been the subject of extensive scholarly and policy debate (Alesina et al., 2019a; House et al., 2020). Although there have been recent discussions of the distributional effects of fiscal adjustment measures, the evidence is primarily anecdotal (Varoufakis, 2016; Alpino et al., 2022). The study involves an analysis of two prominent fiscal adjustment measures – Ways and Means financing, and austerity measures – to determine the most appropriate strategy for managing fiscal imbalances and economic crisis in Nigeria. Specifically, the study aims to uncover the justification for adoption of Ways and Means financing in Nigeria's public financial management. It also explores the dangers posed by Ways and Means financing in Nigeria. Lastly, the study examines austerity measures as alternative strategies in correcting the fiscal imbalances in Nigeria.

Conceptual Review

Ways and Means Financing

The term "Ways and Means financing" was first used by the British Parliament in the 17th century to describe the allocation of funds to satisfy the needs for national expenditures. Economists and financial specialists use the word to explain inflation and debt in Nigeria, but it gained popularity in government circles as a last-resort financing method. When the government borrows money from the central bank to pay for public expenditures, the fund is referred to as Ways and Means. According to Section 38 (1) of the Central Bank of Nigeria (CBN) Act, such borrowing must be short-term and should only take place "in respect of temporary deficiency of budget revenue." Accordingly, the Federal Government can only receive loans from the CBN in the event of a temporary income shortage (Omorogbe, 2021; Anudu, 2023).

Austerity Measures

Austerity measures describe government initiatives meant to lower the debt of the public sector. In addition to increasing financial instability within a nation, unrestrained growth in public debt has the potential to trigger a national or even regional recession. In order to enhance its revenue, the government may decide to raise taxes when formulating economic austerity measures. The rate of indirect taxes (consumption tax) or direct taxes (income tax and wealth tax) may be raised by the government. It can then pay down its debt with the extra tax money. On the other hand, the government might cut back on spending. By cutting spending, the government's debt can also be reduced (Glomm et al., 2018; Alesina et al., 2019; Corporate Finance Institute [CFI], 2023; Chenge, 2025).

Fiscal Imbalance

When a government's expenditure (and consequent debt) exceeds its long-term capacity to generate income to pay for this expenditure and debt, fiscal imbalance typically occurs. This frequently happens when the government undertakes long-term spending commitments based on unduly optimistic projections of the obligation's cost or the capacity or desire of taxpayers to pay for it. Vertical and horizontal fiscal imbalances are the two forms of imbalances that might affect a government's revenue and spending. When revenue and expenditure for various regions of the nation do not equal one another, this is referred to as a horizontal fiscal imbalance. Conversely, a vertical fiscal imbalance occurs when revenue and expenditure at various governmental levels do not equal one another (Matier et al., 2001; Bird & Tarasov, 2002; Sharma, 2007; 2012; Chenge & Oigbochie, 2023; Kenton, 2024).

Review of Related Literature

Fiscal Imbalance and Macroeconomic Stability

It is preferable to keep up a sound fiscal policy in order to achieve sustainable development and preserve macroeconomic stability. At any given time, fiscal imbalance can present significant challenges to the overall economy's management. In order to finance these fiscal imbalances, the government implements a number of initiatives. The banking system, which includes the central bank, deposit money banks, nonbank public, and privatization revenues, as well as domestic and foreign debt, can provide this type of funding (Effiong & Okijie, 2021).

When such imbalances are financed, more issues arise in the economy. While the Ricardians maintain that public debt has no negative effects on the economy, the Traditionalists contend that a growing budget deficit poses a significant threat to the economy. According to Nayab (2015), these issues include decreased economic growth, a current account deficit, rising inflation, and rising public debt in the economy. Boariu and Bilan (2007) asserted that inflation can also emerge as the result of debt financing of fiscal imbalance when it unintentionally causes the amount of money available in the economy to increase above what is necessary. From the aforementioned, fiscally dominant countries that experience ongoing budget deficits will need to create money, or seigniorage, to cover them, and this fuels inflation (Sargent & Wallace, 1981; Effiong & Okijie, 2021).

Previous research maintains that fiscal imbalance is a significant factor that contributes to inflation in an economy (Fisher, Sahay & Vegh, 2002; Ljunqvist & Sargent, 2000). The fiscal perspective also acknowledges that political unpredictability, diminished borrowing capacity, and ineffective tax collection pose a threat to lowering the relative cost of seigniorage and increasing reliance on the "inflation tax" (Calvo & Vegh, 1999; Catao & Terrones, 2003). The data rarely demonstrates a clear positive correlation between the magnitude of the budget deficit and the rate of inflation, as established by counterarguments to this claim (Blanchard & Fisher, 1989; Effiong & Okijie, 2021).

There are two ways to finance the fiscal imbalance: debt financing and monetary financing. Issuing fresh money to cover the excess of public spending that results in budget deficits is known as monetary financing (Boariu & Bilan, 2007). It has been proposed that governments should only use monetary financing to cover the budget deficit when they "force the issuing of money by putting into circulation more money that is normally necessary" (Filip, 2002). It is generally accepted that funding budget deficits through money issuance leads to inflation since governments mostly use it to pay wasteful spending. In order to finance the budget deficit, the government can also embark on debt financing which implies public borrowing. A public loan may have a variety of undesirable consequences. Boariu and Bilan (2007) and Effiong and Okijie (2021) aver that it leads to "the accumulation of public debt and to the increase in interest payments, which indicates an increase in the budgetary expenses that states have to cover."

Since fiscal imbalance can lead to macroeconomic instability – which can include changes in output growth, price increases, stifling private investment, and perhaps a decline in employment – research has been conducted to determine the likelihood of such scenarios. The impact of fiscal imbalance on economic growth has been the subject of conflicting findings among scholars. To some research, fiscal imbalance has a positive impact on economic growth (Bose, 2007; Ahmad, 2013; Pelagidis & Desli, 2014); however, other studies, such as Augustt et al. (2015), Biza et al. (2015), Cebula (1995), Fatima et al. (2012), Ghura (1995), Hassan et al. (2014), Karras (1994), Tung (2018), and Van and Sudhipongpracha (2015) have found that fiscal imbalance has a negative impact on economic growth. Meanwhile, the research by Rahman (2012), and Velnampy and Achchuthan (2013) have indicated a neutral position regarding the impact of fiscal imbalance on economic growth.

The Role of Ways and Means Financing in Modern Economic Systems

The Bank of England was established in 1694 with a £1.2 million loan to the government to finance the Nine Years' War with France, made possible by the first Ways and Means Act. Early in the 20th century, Ways and Means loans ceased to be the main source of funding because their use overflowed money markets with cash, which made it difficult for the Bank to control short-term interest rates. The facility, which has been retained for cash flow purposes, was crucial to the 2008 financial crisis, reaching £20 billion. A temporary extension of this facility has been announced by the Bank and the Treasury (Anudu, 2023; Papadopoullos, 2020).

Depending on different perspectives, Ways and Means financing may or may not be considered monetary financing. Spending newly created money is nearly always a part of budget deficits since selling government bonds to commercial banks generates bank deposits.

In the 1970s, this kind of monetary financing was common. Chancellor of the Exchequer, Denis Healey, credited the achievement "primarily to the far superior fiscal probity of the Labour Party" when the annual money supply growth dropped from 29% in 1973 to 11% in 1975. Since central bank purchases eliminate some market discipline, most economists favor a definition of monetary financing that includes purchases made using central bank funds as opposed to deposits in private banks. Although purchases are made on the secondary market, it is unclear whether quantitative easing qualifies as monetary financing (Papadopoullos, 2020; Adrian et al., 2024; Chadha, 2024; Corporate Finance Institute [CFI], n.d.).

When the government takes money out of the Ways and Means account, it is comparable to issuing a short-term bond directly to the central bank, albeit with a little more flexibility. The Treasury has been eager to downplay the possibility that it could be interpreted as monetary financing. The facility, it emphasized, is a short-term cash flow management tool, and it will continue to rely on markets as its main source of funding. The Treasury's position attempts to uphold the postulation of the then governor of the Bank of England, Andrew Bailey, after he stated in the April 2020 Financial Times that the "Bank of England is not doing monetary financing" (Papadopoullos, 2020; Omorogbe, 2021).

The monetary authorities of the United Kingdom have a history of promoting the efficient operation of bond markets. In order to avoid unduly distorting relative bond prices, they were cautious during QE to buy bonds evenly along the yield curve. It makes sense that they would employ Ways and Means to prevent the primary market from being disrupted. Despite having the appearance of monetary financing, Ways and Means is presently too limited and short-term to be used in accordance with the conventional strategy of UK debt management policy. The facility, however, is clearly becoming a more permanent part of the national debt. According to the Bank and Treasury's joint statement, "any drawings will be repaid as soon as possible before the end of the year." But this, in certain instances, could easily be prolonged especially if the economy was having trouble recovering, and there were numerous financial obligations to meet before the year end. While asset purchases and zero interest rates have lasted longer than many economists initially anticipated, temporary policies have a little more permanency in times of crisis (McMahon & Macchiarelli, 2020; Papadopoullos, 2020; Smith, 2020).

Depending on how much and for how long, borrowing directly from the central bank may or may not induce inflation. The Bank of England estimates that the UK's money supply is £2.2 trillion, and during the 2010s, it grew at a rate of about 4% annually. Although a change in the money supply rarely results in a corresponding shift in prices, it does provide a useful indication of the scale of changes. Less than 1% of the money supply is added when £20 billion is borrowed for a month. For a year or two, borrowing £200 billion would increase the money supply by 10%, potentially contributing a few percentage points to inflation. Unless there is downward pressure on gilt prices, there won't be any incentive to issue bonds directly to the Bank or increase Ways and Means borrowing to such levels. Such steps would be counterproductive, given market borrowing remains inexpensive. However, the monetary financing discussion will become much more fascinating if market rates do begin to climb (McMahon & Macchiarelli, 2020; Papadopoullos, 2020; Hulsewig & Steinbach, 2021).

Austerity Measures and Economic Management

The Greek national debt crisis served as the impetus for austerity. The ability of other Eurozone nations, particularly Portugal, Ireland, Italy, and Spain, to control their deficits was called into question by worries about a potential Greek default. As a result, what started out as a private debt crisis turned into a European sovereign debt crisis. To try to calm the bond markets, the International Monetary Fund (IMF) and the European Central Bank (ECB) imposed strict austerity measures as a requirement for their support. This successfully transferred the crisis's burden from the private (financial) sector to the government (Goddard et al., 2009; Konzelmann, 2012; Beker, 2014).

Reducing a nation's deficit, or the gap between government spending and revenue, is the goal of economic austerity. Therefore, austerity policies involve a mix of higher taxes and decreased governmental spending. It is not as simple as it may seem at first glance, though, because public deficits need to be funded, and the funding strategy – borrowing as opposed to creating money – has its own set of economic, social, and political repercussions. As a result, it is impossible to effectively divorce the economics of austerity from its social and political setting (Posner, 2015; Campoy-Munoz et al., 2022; Biten et al., 2023).

The public debt linked to financial institution bailouts in the wake of the 2007–2008 financial crisis not only infuriated bond markets but also enraged voters, escalating the debate over whose interests should come first. In several of the "peripheral" Eurozone nations, social instability brought on by externally enforced austerity made this even more apparent. Democratically elected governments were replaced by "technocrats," who were tasked with enforcing increasingly strict austerity measures, in addition to a drastic rollback of the welfare state (Posner & Blondal, 2012; Beker, 2014; European Federation of Public Service Unions [EPSU], n.d.). However, as Keynes (1936) cited in Konzelmann (2012) noted, financial markets are subject to irrational fluctuations, ranging from unchecked optimism to debilitating pessimism. Austerity will therefore undoubtedly face more criticism if it is unable to persuade the financial markets that governments can control their deficits, particularly if it hinders economic growth. The basic question of what austerity is meant to achieve is thus brought up.

Politicians argue that austerity is necessary to “balance the budget,” and that it also serves to placate international financial markets, bond dealers, and organizations like the ECB and the IMF. Making public debt more “affordable” is the goal, regardless. However, a country’s ability to manage its debt is not solely dependent on its size. During prosperous times, fiscal debt is easier to control because it is based on the equilibrium between government spending and revenue. Keynes acknowledged this and contended that in order to keep the economy from overheating and producing inflation, austerity should be implemented at the peak of the business cycle. This viewpoint holds that when unemployment is the issue, austerity is the antithesis of stimulation, which is the recommended course of action during a downturn (Konzelmann, 2012; Fieldhouse et al., 2019).

However, calls for economic austerity have typically been linked to the bottom of the business cycle in the decades leading up to the 2007–2008 financial crisis because of the reluctance of many politicians to control the good times of a boom and the “overwhelming pessimism” that results from the collapse of successive boom-inflated bubbles. At these times, austerity measures have been framed by the indisputable reasoning that, after living beyond our means for too long, it is now time to practice restraint and prudence. They have been presented as both an economic necessity and a moral imperative. Some critics have even gone further to argue that austerity, in itself, can be expansionary (Konzelmann, 2012; Posner & Blondal, 2012; Alesina et al., 2019; EPSU, n.d.).

Theoretical Framework

The Vertical Fiscal Imbalance (VFI) theory of Ruggeri and Howard’s (2000) was used as the theoretical basis of the study. The idea behind VFI originated with previous research that looked at Canada’s fundamental budget imbalances. Ruggeri et al. (1993a) establish a stronger connection between structural imbalance and the concept of budgetary sustainability. For instance, structural balance implies a constant or reducing debt-to-GDP ratio with a limit of zero, according to Ruggeri et al. (1993a), given a number of assumptions. Then, using the foundational principles of VFI and the initial values for the budget balance and debt, Ruggeri et al. (1993a; 1993b) simulate future values of the budget balance and debt-to-GDP ratio for every level of government. Their simulations, between 1992/1993 and 2013/2014, reveal that the provincial debt-to-GDP ratio increased while the federal debt-to-GDP ratio decreased, thus illustrating VFI (Matier et al., 2001).

Ruggeri et al. (1993a) establish a linkage between structural imbalance and the stability of the debt-to-GDP ratio, which serves as a helpful foundation for conceptualizing VFI in a dynamic framework that is closely related to the idea of fiscal sustainability. One measure of VFI is the comparison of the size of (structural) budget balances across time across governmental levels (i.e., the method used in Ruggeri (2000) and Ruggeri & Howard (2000)). This strategy is not totally satisfactory, though, as it only considers the relative sizes of the budget balances. Simply put, the difference between budget balances at different levels of government at any given time is used to determine the amount of VFI (Matier et al., 2001; Bird & Tarasov, 2002; Sharma, 2007; 2012; Aldasoro & Seiferling, 2014).

A measure of VFI that is only dependent on the relative magnitude of the budget balances in a particular year runs the risk of creating a "fiscal illusion." According to Auerbach et al. (1991), a government can theoretically implement any kind of fiscal policy while simultaneously recording a deficit or surplus of any magnitude. They maintain that, "unfortunately, from the perspective of economic theory, the deficit is an arbitrary accounting construct." (Auerbach et al., 1991: p. 57). Given that economic theory does provide guidance for avoiding this possible issue, creating an indicator of VFI based on an arbitrary accounting construct does not appear to be totally sufficient (Matier et al., 2001).

In applying this theory, the study maintains that VFI can transiently be corrected by Ways and Means financing and austerity measures. Ways and Means financing offers quick liquidity but does not alter the fundamental structure, resulting in a continuous revenue-expenditure disparity. Relying on Ways and Means financing to cover a structural VFI would result in increased debt and consequent inflationary pressure, worsening rather than resolving the issue. Austerity measures, on the other hand, might temporarily reduce the amount of budget imbalance by lowering spending or raising revenue. However, if the VFI is caused by a mismatch in constitutional responsibilities (i.e., when spending obligations exceed revenue assignments), austerity may force the government to remove important services, potentially causing social or political problems, without addressing the underlying structural issue. Adoption of either policy is thus contingent on economic conditions, deficit severity, growth requirements, and long-term viability.

Methodology

The study used documentary research design. Therefore, secondary sources of data comprising published materials were used for data collection. Data was derived from reports of agencies like the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), Debt Management Office (DMO), and Ministry of Finance, Budget and National Planning

(FMFBNP). Data analysis was done using mixed methods content analysis which integrates both quantitative and qualitative analytical approaches.

Discussions and Findings

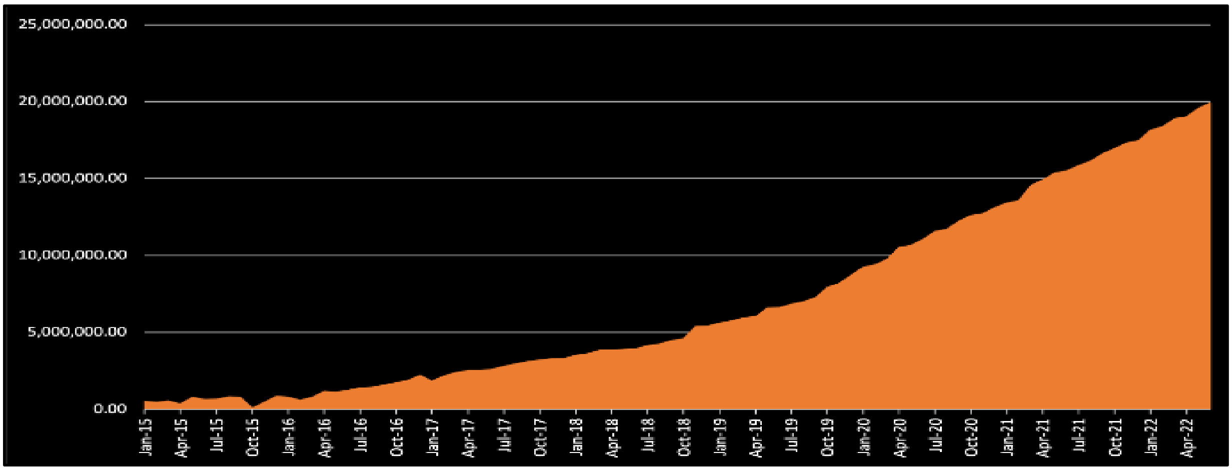
Justification of Ways and Means Financing in Nigeria's Public Financial Management

In a fiscal year, the government publishes its budget, and a fiscal imbalance occurs when spending exceeds revenue. Most of the money used to finance the fiscal deficit comes from asset sales, borrowing from both local and foreign markets, and receiving grants from multilateral organizations. In most cases, however, actual revenue is less than anticipated, and actual expenditures are higher than anticipated. This implies that there will be a greater fiscal deficit, which will allow the central bank to intervene using its own methods. Note that this circumstance is very common in developing nations, and it has been particularly evident in the Nigerian context (Kuranga, 2021).

The apex bank (central bank) may lend money to the government under the Ways and Means clause if it needs emergency or short-term funding to cover fiscal deficits that are projected to be delayed. The statute has provisions capping the amount of money used to finance fiscal deficits at 5% of the previous year's income. But ever since there was a noticeable decline in government revenue, the government has been largely dependent on the central bank to fund its spending plans through Ways and Means financing. The CBN reports that as of June 2022, the Ways and Means balance was ₦19.9 trillion, up from ₦17.4 trillion at the end of 2021 (Figure 1).

Figure 1

CBN Ways and Means Financing Statistics in Nigeria



Source: CBN, 2022.

The federal government's inability to meet its revenue expectations has resulted in an increase in CBN Ways and Means financing. For instance, the government only got ₦3.4 trillion in allotted revenue in the first nine months of 2021, as opposed to the ₦4.9 trillion it had projected. A prorated revenue of ₦3.3 trillion was also budgeted by the federal government for the first four months of the year (2022), but only ₦1.6 trillion, or 49% of the target, was received. ₦1.9 trillion, or 119% of the total amount of money collected, was used to pay down the debt, of the ₦4.7 trillion in expenses. Perhaps this explains why CBN Ways and Means financing increased tremendously in the first half of 2022 (Nairametrics, 2022; Olowo, 2024).

In keeping with a credit extension from 2021, the CBN extended a total of ₦2.45 trillion in the first half of 2022. This amounts to over ₦5 trillion annually. The Covid-19 outbreak and its impact on oil earnings caused government revenues to plummet, therefore the CBN lent the government a total of ₦4.38 trillion in 2020 and ₦4.34 trillion in 2021. The Buhari administration, which oversaw a period of record low oil prices, high oil theft, and oil supply caps, mainly relied on Ways and Means financing to fund its budget deficits. When the government took office at the end of May 2015, Nigeria's Ways and Means balance was approximately ₦789.6 billion. However, the debt owed to the CBN, which was ₦20 trillion as at June 2022, was 25 times greater than it was in 2015, indicating an unprecedented use of the Ways and Means provisions (Anudu, 2023).

The CBN credit policy for 2020 stipulates that the federal government will continue to have access to Ways and Means Advances to finance deficits in its budgetary operations. It also states that these advances must be liquidated expeditiously and paid back before the end of the year in which they were made (Adegboyega, 2024). The increase in Ways and Means balances, nonetheless, suggests that reimbursement is not occurring as planned. It is unlikely that this money will ever be recovered unless it is through federal government bonds, and it may take a period of five to ten years. The CBN and the finance minister, Dr. Zainab Ahmed, announced intentions in January 2019 to turn the apex bank's loans into tradeable securities. The Director General of the Debt Management Office, Ms. Patience Oniha, reaffirmed this stance in February 2019, stating that the government's borrowing through Ways and Means financing was no longer viable, which prompted the decision to convert the loans into bonds (Nairametrics, 2022; Omogbolagun & Adaji, 2024).

Dangers of Ways and Means Financing in Nigeria

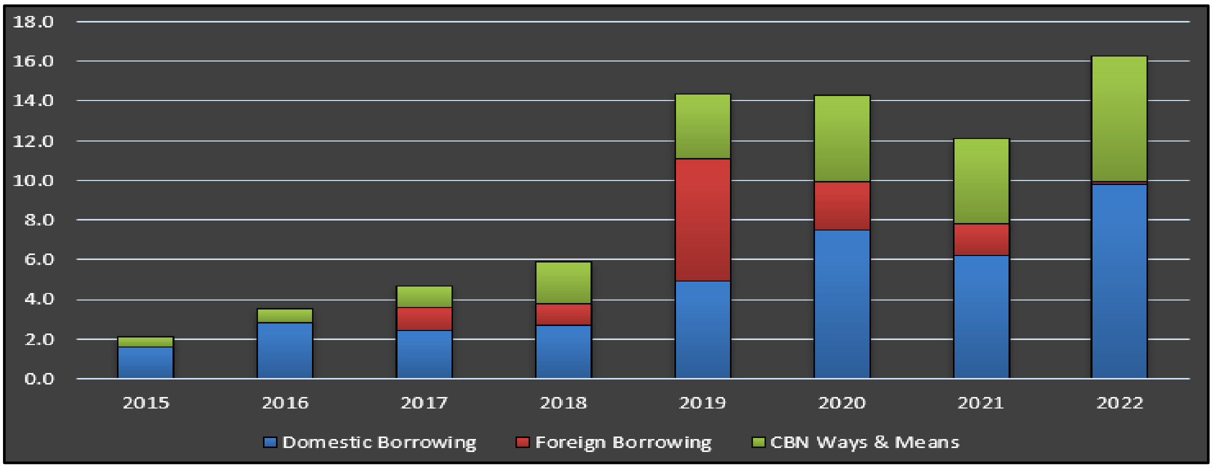
Initially, CBN Ways and Means financing – particularly in 2020 – was not viewed as a problem because there was a pandemic which greatly affected the economy, creating a recession. In order to spend its way out of the recession, government operations crippled revenue.

Consequently, the federal government issued bonds to the CBN, which in turn assisted in printing money for the federal government. This is also true for industrialized economies, where monetary and fiscal stimulus plans were commonplace. In actuality, 2020 saw the printing of around 25% of all US dollars ever created (Kuranga, 2021).

However, it appears that the use of CBN Ways and Means in deficit financing is a structural rather than an isolated incident. This is due to historical evidence that, even in the absence of an economic crisis, the CBN has been funding a significant portion of the federal government's deficits. For instance, the CBN supported 52.2% of the ₦3.64 trillion fiscal deficit in 2018. The CBN also financed 78.3%, or ₦3.31 trillion, of the ₦4.23 trillion total fiscal deficit in 2019 (Figure 2). Since there was no recession during those times, the CBN's decision to print money in order to cover a sizable portion of the federal government's fiscal deficit defies economic theory.

Figure 2

Borrowing versus CBN Ways and Means Financing (₦'trn)

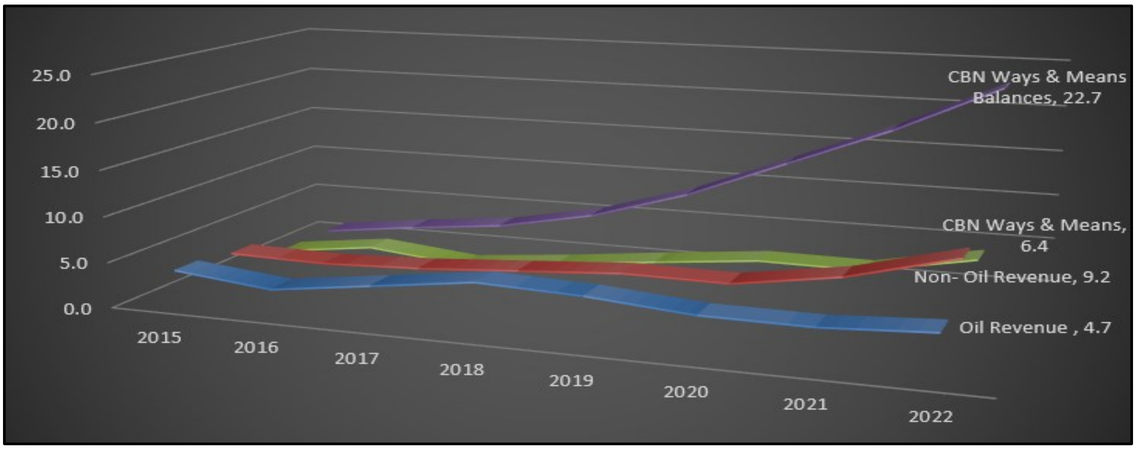


Source: CBN, 2022; 2023; DMO, 2023; NBS, 2023.

The problem is exacerbated when you compare CBN Ways and Means financing with oil and non-oil earnings. From available facts and figures, it is evident that Ways and Means financing has increased more than both oil and non-oil revenues since 2015. For instance, Ways and Means financing was ₦3.3 trillion in 2019 (with Ways and Means balances at ₦8.7 trillion), while oil revenue was ₦5.1 trillion. In 2022, the situation worsened as oil and non-oil revenue totalled ₦13.9 trillion, while Ways and Means financing was ₦6.4 trillion (with Ways and Means balances at ₦22.7 trillion – i.e., greater than the sum of oil and non-oil revenue) (Figure 3).

Figure 3

Oil & Non-Oil Revenue versus CBN Ways and Means Financing (₦'trn)

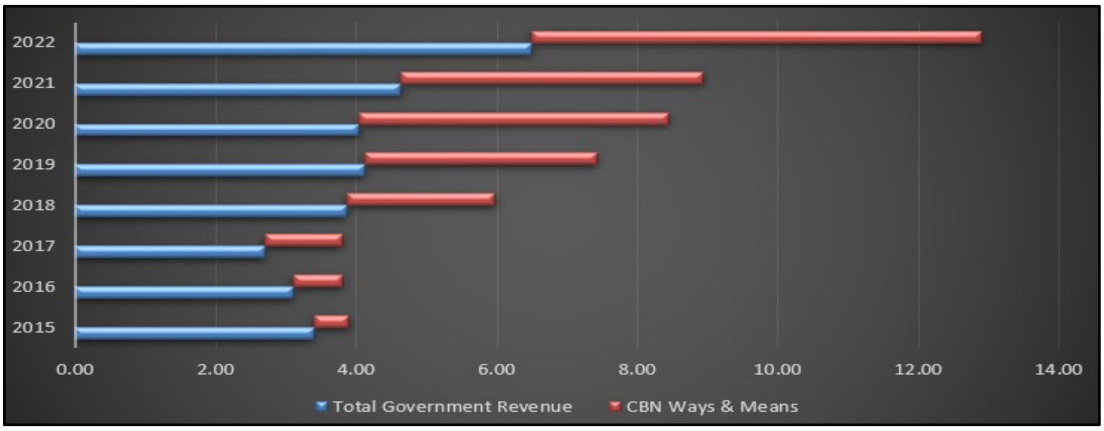


Source: CBN, 2022; 2023; DMO, 2023; NBS, 2023.

According to policy experts, the Buhari administration should not have requested more than ₦135 billion, or 5% of ₦2.7 trillion in revenue that was realized in 2017. Nevertheless, Ways and Means financing that constituted 77.8% of revenue from the previous year, was taken by the government. While Ways and Means financing was ₦3.3 trillion in 2019, representing 85.27% of 2018 revenue, actual revenue (i.e., federal government retained revenue) was ₦4.12 trillion. The government borrowed 7% more from the CBN in 2020 than it did in 2019, as there was ₦4.04 trillion in actual revenue and ₦4.4 trillion in Ways and Means financing, which accounted for 107% of the revenue in 2020. In 2021, Ways and Means financing was ₦4.3 trillion, or 106.4% of total revenue, whereas actual revenue was ₦4.64 trillion. Ways and Means financing was ₦6.4 trillion, or 138% of 2021 revenue (in 2022), while actual revenue in 2022 was ₦6.49 trillion (Figure 4).

Figure 4

Federal Government Retained Revenue versus CBN Ways and Means Financing (₦'trn)



Source: CBN, 2023; FMFBNP, 2023.

The government's increased reliance on CBN Ways and Means financing has a number of ramifications. First of all, it is against the CBN Act (2007) which stipulates that it is an emergency fund that should be short-term and not exceed the set limit. Repeated recourse to Ways and Means financing therefore signals that any president in office or the federal government can break the law without any consequences. By increasing money or capital market liquidity, Ways and Means financing also contributes to inflation. Money market is a market where short-term instruments are traded. Treasury bills and mutual funds are two examples of such financial products. The capital market, on the other hand, refers to a market where long-term securities like stocks and bonds are exchanged. An increase in the economy's inflation rate is largely caused by excess liquidity in the system that is not supported by productivity. To put it another way, if the pace of money printing increases more quickly than economic output, money loses value and eventually leads to inflation. This causes hyperinflation over time and would seriously harm the economy. Furthermore, due to the extra liquidity that has been pushed into the economy, the exchange rate is also negatively impacted. All these factors suggest that the system's excess liquidity can cause macroeconomic instability.

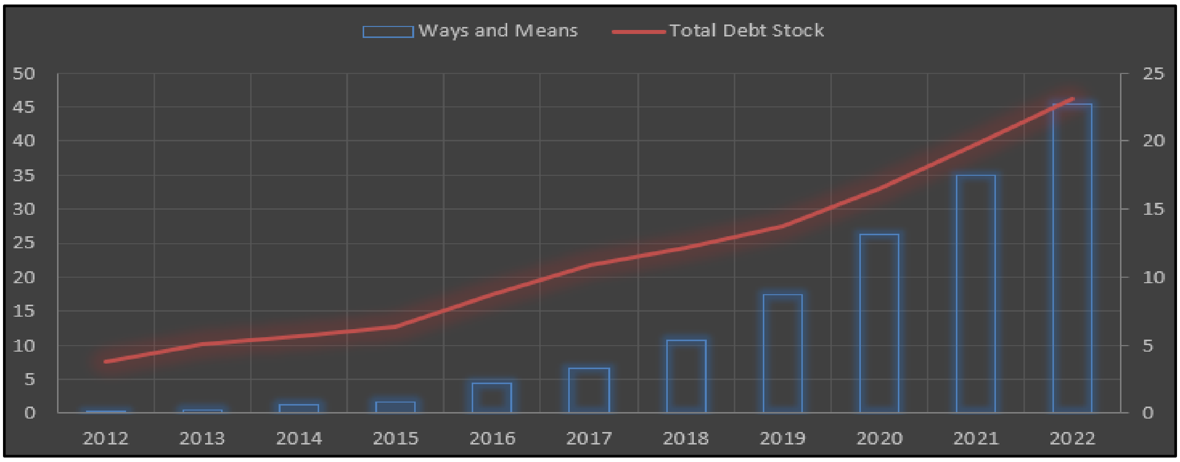
Additionally, experts contend that Nigeria's inflation is impacted by the government's current attempt to securitize Ways and Means loans. Rather than repaying the CBN, the federal government just overinvests in the money or capital market by securitizing Ways and Means loans. When you market a bond worth ₦11 trillion, for example, investors will trade and pay for it. This automatically makes the economy more liquid – i.e., increases the amount of money that is available to the economy – consequently driving up inflation. This stance has also been emphasized by the World Bank (cited in Anudu, 2023), which notes that "between 2020 and 2021, inflation left about eight million more Nigerians below the poverty line by increasing the total number of poor people to about 90 million." Stated differently, the CBN is party to government decisions and policies that have contributed to Nigeria's rising inflation over the past six years. The high cost-of-living is one way that growing inflation rate hurts the average Nigerian (Chenge, 2026).

Furthermore, because all loans must be paid back with interest, no matter how small, Ways and Means financing saddles Nigeria with the burden of debt servicing (Figure 5). After the debt repayment, there are insufficient resources left over for development initiatives and infrastructural advancement to satisfy the socioeconomic needs of the average person. Also, it limits Nigeria's ability to innovate. Considering that the federal government has the CBN to generate money for needed operations, it appears to have no interest in increasing revenue.

Increased reliance on Ways and Means financing – without repayment – destroys the ability to leverage revenue avenues, making it difficult for the government to fund programs that can improve livelihoods. Anudu (2023) and Kuranga (2021) maintain that if the CBN becomes incapable of funding government operations, the federal government will collapse because it will lack the means to finance its operations, creating internal imbalance and sending a signal to the external sector.

Figure 5

Total Debt Stock versus CBN Ways and Means Financing (₦'trn)

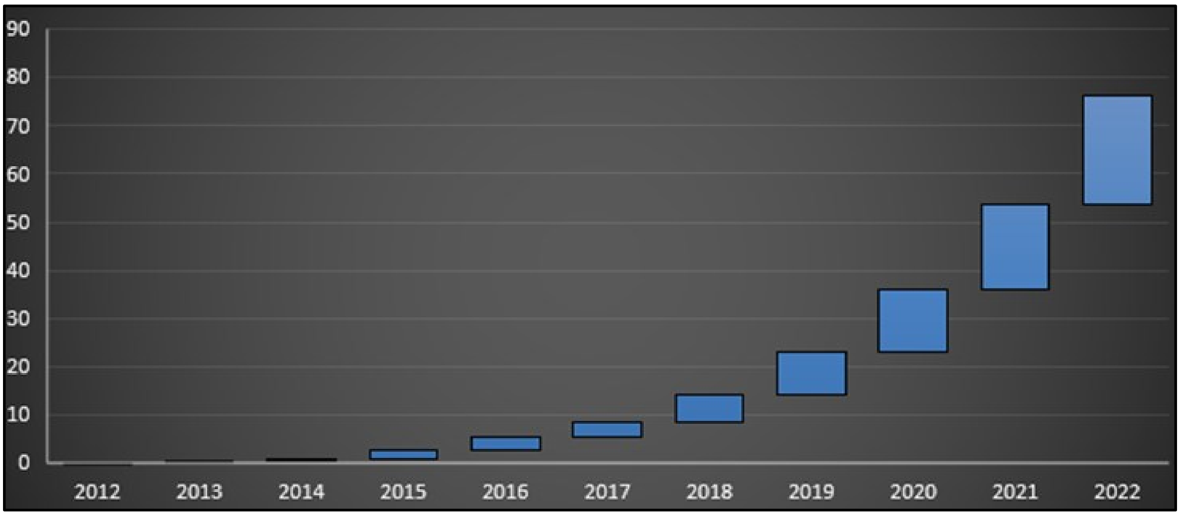


Source: CBN, 2022; 2023; DMO, 2023; NBS, 2023.

In response to the increasing Ways and Means balances (Figures 3, 4 & 5), the finance minister disclosed that discussions were underway to codify CBN financing in order to increase accountability for the loans acquired. As a result, the CBN will consider offering the loans to the general public in the form of bonds, and the public will provide the funds. This implies that the federal government would be held accountable to the public for repayment, relieving the CBN of some of its load. This is expected to be a better approach since the government will take revenue mobilization and waste reduction seriously if it does not want to fall behind on paying its citizens (Kuranga, 2021). From the CBN monetary account record, as of December 2021, the bank's outstanding sum from its overdraft to the federal government was ₦17.45 trillion. By the end of 2022, the total outstanding overdraft was approximately ₦23 trillion (i.e., if ₦17.45 trillion Ways and Means balance of 2021 is added to the ₦6.4 trillion Ways and Means annual receipt of 2022) (Figure 6). Thus, it will take roughly six to ten years for the federal government to securitize the entire outstanding overdraft assuming the entire bond allotment of 2022 is used for computation.

Figure 6

Outstanding Overdraft to the Federal Government (₦'trn)



Source: CBN, 2022; 2023; DMO, 2023.

Given that the federal government is providing bonds to fund its budget, it will take a number of years to formally approve the loans, particularly since it does not want to give up the low-interest environment anytime soon. If the federal government, then chooses to securitize aggressively, rates will probably rise sharply and aggressive securitization would push out private sector borrowing, which will likely limit growth.

Austerity Measures as Alternative Strategies in Correcting Fiscal Imbalances in Nigeria

The National Assembly's decision to approve the securitization of CBN Ways and Means loans to the federal government, estimated at ₦22.7 trillion (in 2022), caused a stir in the Nigerian polity. The arrangement put the loans on a 40-year tenor with a three-year principal repayment moratorium and an annual interest rate of 9%. As previously mentioned, Ways and Means financing refers to the process by which a government borrows money from the nation's central bank in order to manage immediate cash flow mismatches. Concerns have been raised regarding the practice, particularly in nations where the central bank lacks the independence to reject a request if it is deemed unnecessary or detrimental to the economy. When used without caution, Ways and Means financing can lead to unchecked spending and money supply surges that are not accompanied by productive activity, resulting in inflation and currency devaluation (Omorogbe, 2021).

Fiscal austerity is perceived as a more effective way to control fiscal imbalances. It denotes a program of stabilizing government debt and reducing deficits by a significant amount, either through tax hikes, spending cutbacks, or both. Austerity measures usually take the form of multiyear programs, which are disclosed beforehand and occasionally modified in the middle of the process. When a government decides to start a fiscal consolidation program, choosing which taxes to raise or which spending items to cutback usually comes after much debate. The first decision is usually how much the deficit should be reduced. Therefore, tax hikes and spending cutbacks are not independent of one another if the objective is to reduce the deficit by a specific amount because they must add up to a predetermined number (Alesina et al., 2019).

Spending cutbacks are all too frequently portrayed as harsh austerity measures that impede the economy – an unavoidable evil. This is a spurious claim because recent economic research has shown that reducing spending and stabilizing government debt can spur economic expansion. From optimistic projections, the United States Federal Government public debt, which already stands at an astounding $28.8 trillion, or equal to the country's yearly economic output, is expected to soar to 166% of GDP by 2054. The rise in interest rates and a small number of entitlement programs, such as Medicare, Social Security, and Medicaid, are the main causes of this skyrocketing debt. Economic growth is already being slowed by excessive debt levels, which are also raising inflation and interest rates. This makes borrowing and investing more difficult for both families and corporations. Another implication is that interest rates rise when the federal government takes on a lot of debt because it is competing with the private sector for scarce financial resources (i.e., the crowding-out effect). Lower wages, a less competitive economy, and less productivity are the outcomes. Spending reductions lessen this crowding-out impact by releasing funds for private sector investment, job creation, and income growth (Boccia & Lett, 2025).

To raise more money, governments may also increase taxes on people, families, or businesses. In fiscal austerity, taxation frequently entails tax increases to pay for government expenditures or deficit reduction. Raising tax rates, expanding the tax base, doing away with tax breaks or deductions, or enacting new taxes are some ways to do this. Tax increments or hikes are the most popular austerity measures used to mobilize revenue and reduce government spending by putting an additional burden on taxpayers. Raising income tax rates or enacting additional taxes are examples of tax increments that directly raise the amount that people and businesses must pay, which raises government tax revenues (CFI, 2023; Kahongeh, 2024). However, because they limit the amount of money available for both individual and company spending and investment, tax hikes may have a dampening effect on economic activity.

Summary of Findings

1. Ways and Means financing enables the government to borrow from the central bank in the event that it needs short-term or emergency funds to finance fiscal deficits.

2. There is a significant risk associated with Ways and Means financing, particularly in nations where the central bank lacks the independence to reject demands for the advances if it deems it superfluous or detrimental to the economy. Unmeasured use of Ways and Means financing can stimulate unchecked spending and increased money supply that do not correspond with productive activity, leading to inflation and currency devaluation.
3. Fiscal austerity is perceived as a more effective way of managing fiscal imbalances. It denotes a strategy of stabilizing government debt and significantly reducing deficits by using either tax hikes, spending cutbacks, or both.

Conclusion

Fiscal austerity offers a better solution to management of fiscal imbalances than Ways and Means financing. Fiscal austerity is based on the idea that budget deficits can be decreased and the growth of public debt halted or even reversed by cutting government expenditures and/or raising taxes. Proponents of austerity measures contend that they can boost economic stability, rebuild public trust in the economy, and lay the groundwork for long-term sustainable growth. Critics counter that austerity measures can worsen the effects of economic downturns by decreasing aggregate demand, which lowers economic activity, increases unemployment, and slows growth. They contend that governments ought to give priority to stimulus plans in these situations in order to increase economic activity and create jobs. The study concludes that a number of variables, such as the economic environment, the scope and timing of the measures, and the particular structural features of the economy, determine the effectiveness of fiscal austerity.

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ASSESSMENT OF NET WORKING CAPITAL MANAGEMENT STRATEGIES IN THE CONTEXT OF THE COVID-19 PANDEMIC, USING LPP S.A. AS AN EXAMPLE

ABSTRACT

The purpose of the article. The main objective of the article was to identify the net working capital (NWC) management strategy of LPP S.A. The following research thesis was adopted: LPP S.A., as a trading company, pursued an aggressive NWC strategy from 2019 to 2023.

Methodology. Empirical research covered the period from 2019 to 2023 and was performed using economic and financial analysis tools with a focus on ratio analysis. The following companies were used as benchmark companies: VRG S.A., Etos S.A., Wittchen S.A., Wojas S.A., Monnari Trade S.A., CDRL S.A., Esotiq & Henderson S.A., Protektor S.A., VCO S.A. and Hurtimex S.A.. Data was extracted from the EMIS database and LPP S.A.'s financial reports. Critical literature studies were also used in the study.

Results of the research. The research confirmed the thesis that LPP S.A. pursued an aggressive working capital management strategy as a commercial enterprise in the years 2019-2023. The aggressive WCM strategy contributed to the company's higher financial results and was identified on the basis of liquidity, cash cycle, inventory and short-term liabilities ratios, as well as the share of current liabilities and equity in the financing structure.

Keywords: net working capital management strategies, profitability, corporate finance

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Introduction

Financial decisions regarding the level of net working capital (NWC) are generally aimed at enabling the company to maintain financial liquidity and achieve the optimal size and structure of current assets and their sources of financing (Wasilewski & Chmielewska, 2006: 103; Setianto & Pratiwi, 2019: 4).

Financial liquidity is one of the most important criteria for assessing the financial condition of a business entity and determines its ability to settle short-term liabilities on time and maintain the continuity of basic operational processes (Comporek, 2017: 60). An improperly managed liquidity strategy is a much more common cause of business failure than a failure to achieve an adequate level of profitability (Baños-Caballero et al., 2020: 234).

The NWC strategy affects the cost of capital of a company and, consequently, its market value. An economic entity that maintains a high (positive) NWC reduces its risk of losing liquidity, as highly liquid assets (current assets) are financed by long-term capital. The literature on the subject indicates that this situation leads to an increase in the weighted average cost of capital (WACC), as short-term capital is generally a cheaper source of financing (Duggal & Budden, 2015: 79).

Net working capital is one of the main categories taken into account by banks in the creditworthiness assessment process (Apak et al., 2016: 648–655). In addition, the chosen working capital strategy affects the level of financial flexibility, which determines the company's ability to respond in a timely and appropriate manner in a changing economic environment. Research confirms that by maintaining the potential to finance new projects, a company can engage capital in the most effective investments, which significantly increases its chances for further development (Karimi et al., 2023: 207–215).

NWC strategies can be constructed in two ways: using an income-risk approach or a harmonisation approach. The first one focuses on choosing between maximising the value (profitability) of the company and minimising the risk of losing financial liquidity. The second one focuses on synchronising the maturities of assets and liabilities as closely as possible (Czapiewski & Kubiak, 2008: 22). Regardless of the approach chosen, there are essentially three types of strategies: aggressive, moderate and conservative. In the literature on the subject, strategies that aim to maximise value are referred to as aggressive (dynamic), while those that prioritise the security of operations over the level of profit achieved are referred to as conservative (Kozáková & Pevná, 2015: 288).

The issue of shaping net working capital has been addressed many times in empirical literature. In Poland, this topic has been discussed by, among others, Kuciński (2017), Łobos and Szewczyk (2012), Bolek (2017), Kuś and Hodun (2011), Sobczyk (2008), and Bieniasz and Gołaś (2011). Furthermore, the consequences of choosing a specific NWC management strategy have been analysed by, among others: Al-Slehat, Al-Sharif (2019), Duggal and Budden (2015), Aktas, Croci and Petmezas (2015), Deloof (2003). Empirical research still does not provide a clear answer as to the impact of a specific NWC strategy on a company's performance. The situation becomes even more complicated when working capital decisions are confronted with the reaction of the capital market (Kratz & Kroflin, 2016: 21–32).

The aim of this study is to identify and evaluate the net working capital (NWC) management strategy of LPP S.A., a company operating in the retail sector and listed on the Warsaw Stock Exchange. The study uses financial analysis methods (including ratio analysis methods) as well as comparative methods (including those based on the arithmetic mean for the sector). The research approach is based on a case study.

The assessment of the company's strategy and financial condition in the period from 2019 to 2023 was made on the basis of data obtained from the EMIS database and financial reports of LPP S.A. The following research thesis was adopted: LPP S.A., as a commercial enterprise, pursued an aggressive NWC strategy in 2019–2023. Ten companies with a similar business profile and legal form, which generated the highest sales revenues, were selected as comparable companies. These included: VRG S.A., Etos S.A., Wittchen S.A., Wojas S.A., Monnari Trade S.A., CDRL S.A., Esotiq & Henderson S.A., Protektor S.A., VCO S.A. and Hurtimex S.A. The added value of the article is the empirical evaluation of the working capital management strategies of companies in the retail sector in the context of the Covid-19 pandemic.

The study consists of five sections. The first and second sections present the theoretical and empirical basis for research on net working capital management. The third section presents the financial indicators used to evaluate NWC strategies. Two last sections present the research results and contain a discussion and final conclusions.

Net working capital in corporate finance theory

Working capital is a financial category that essentially covers two variables: gross working capital and net working capital (Damodaran, 2007: 614–616). The first one refers to the value of current assets that are used in the normal operating cycle of an entity and are generally divided into inventories, receivables and short-term investments (Brigham & Houston, 2005: 242). The second one is the difference between current assets (current assets) and current liabilities (short-term liabilities) and is referred to as working capital (Lukić, 2023: 50).

Net working capital in a company can be positive, negative or zero (Kuciński, 2017: 78). Generally, a positive NWC level means that some of the most liquid assets are financed with long-term capital, which has a positive impact on the security of business operations, but involves relatively high capital costs. Zero NWC occurs when current assets are equal to short-term liabilities. Working capital below zero is typical and relatively safe for commercial enterprises, which are characterised by a short collection period and the possibility of extending the repayment terms of current liabilities (Bolek, 2017: 197–198).

Company managers are forced to constantly monitor and control the level of working capital, as it is a financial category that is highly volatile during the course of business (Sierpińska & Wędzki, 1997: 73). Its size is essentially shaped by decisions concerning (Zimon, 2017: 532):

- receivables and cash management;
- trade credit policy;
- control and organisation of procurement and storage processes;
- organisation and supervision of the production and sales process.

The size of working capital also depends on factors beyond the company's control. These include, in particular, the sector in which the entity operates, as different types of activities vary in terms of their turnover cycle and capital intensity. Differences in the size of working capital are also observed within a specific industry. Companies that are characterised by high risk, high cash flow volatility and limited access to external financing, which is determined, among other things, by their size and stage of the life cycle, usually maintain a higher level of NWC (Damodaran, 2007: 630–631).

The company, pursuing a conservative management strategy, generally maintains high levels of inventory and cash reserves. The accumulated cash is primarily intended to protect against the risk of insolvency. Large stocks of materials, etc., protect the company against high fluctuations in raw material prices and supply disruptions, but incur storage costs. High inventory levels contribute to reducing ordering costs and allow the company to meet unexpected demand (Hodun, 2010: 217). A conservative NWC strategy involves, among other things, strict enforcement of receivables and granting trade credit mainly to reliable contractors. This situation increases the company's security, but it loses potential customers (Sobczyk, 2008: 94). A relatively high level of NWC is shaped by minimising short-term liabilities. In this case, the entity achieves financial stability but foregoes the positive effect of financial leverage (Hodun, 2010: 217).

An aggressive strategy is characterised by a relatively low NWC. A company that decides to pursue this strategy does not freeze its funds excessively in inventories, which results in low inventory levels and minimises the cost of maintaining them (Afrifa, 2016: 7). In a dynamic strategy, low cash reserves and a liberal sales policy do not guarantee liquidity security and, in extreme cases, can even lead to bankruptcy (overdue and uncollectible receivables). However, thanks to a lenient receivables policy, companies can increase their turnover and attract new customers (Motlíček & Polák, 2015: 1323; Kuciński, 2017: 80). An aggressive strategy involves making the most of short-term capital, which is a cheaper and more flexible source of financing than fixed capital (Hodun, 2010: 217–218).

A moderate strategy is a middle ground between the strategies described above, which is why a company implementing it strives to achieve a balance between current assets and current liabilities. In this situation, the business entity is not exposed to the risk of losing financial liquidity and generates significantly higher profitability than when applying a conservative strategy (Sobczyk, 2008: 96).

Review of empirical literature on the assessment of net working capital management strategies

Research conducted by A. Kuciński on a sample of 20 companies from the clothing and footwear sector indicates that the implementation of an aggressive NWC strategy contributes to a significant variation in financial results measured by the ROE (return on equity) indicator. The analyses also determined that companies that chose a conservative approach achieved relatively the lowest profitability. Working capital management was determined based on the NWC to total assets ratio (Kuciński, 2017: 84–86). R. Sobczyk, analysing the commercial enterprise sector, also concluded that the NWC level is negatively correlated with the ROE, ROA (return on assets) and ROS (return on sales) ratios (Sobczyk, 2008: 100). R. Duggal and M.C. Budden examining companies belonging to the S&P 500 index, found a negative relationship between NWC and the risk-adjusted rate of return. They argued that excessive involvement of long-term capital contributes to an increase in WACC, and that companies financing themselves using trade credit create value for shareholders (Duggal & Budden, 2015: 79–82).

Research by M. Pawłowska et al., on chemical industry companies indicates a strong and positive correlation between the NWC ratio to total assets and return on equity (Pawłowska et al., 2015: 140). The significant impact of the chosen NWC strategy on the level of profitability generated is also confirmed by the analyses of M.Wasilewski and M.Chmielewska. Their research has shown that Polish dairy cooperatives should adopt a conservative approach to management in order to maximise ROE and ROA ratios (Wasilewski & Chmielewska, 2006: 108). Similar results were obtained by Z. A. F. Al-Slehat and B. M. Al-Sharif when analysing the relationship between NWC and ROA and net operating income (Al-Slehat & Al-Sharif, 2019: 18–19). A.A.A. Abuhommous also confirms the positive effect of investment in working capital, which is that higher expenditure on working capital significantly contributes to increasing the company's growth rate as measured by the change in sales revenue. He also emphasises that small enterprises may avoid trade credit to stimulate growth because its cost is relatively high compared to the cost of other sources of financing if the entity fails to settle payments within the discount period (Abuhommous, 2017: 131–136).

In empirical literature, a commonly used measure of working capital management is the cash conversion cycle, which determines how much time elapses from the moment of cash outflow to settle liabilities (initiation of operational processes) to the moment of cash inflow from collected receivables (sales realisation)[1]. The research by M. Deloof conducted on a sample of 1,009 large Belgian non-financial companies suggests that economic entities that froze their funds in inventories and receivables for longer periods of time achieved lower profitability. The research also indicated a negative correlation between profitability and the period of repayment of current liabilities. This relationship was due to the fact that less profitable entities may experience payment bottlenecks, while highly profitable companies prefer to settle their liabilities more quickly because they hope to obtain a discount (Deloof, 2003: 573–588). A negative relationship between the cash cycle and profitability was found, among others, by E. Oruc and M. Sen (2009), A. Bieniasz and Z. Gołaś (2011), K. Łobos and M. Szewczyk (2012).

Research by A. Kuś and M. Hodun confirms that metal industry companies effectively meet market needs and increase their attractiveness to potential customers by increasing inventory levels and implementing a lenient receivables policy. Their research also suggests that extending the repayment period has a positive impact on profitability (Kuś & Hodun, 2011: 81). The positive effect of the current liabilities cycle is also confirmed by H. Nobanee, A.E. Haddad, and the results obtained justify the fact that trade credit allows you to save part of your cash holdings, which can be reinvested (Nobanee & Haddad, 2014: 42).

N. Aktas et al., analysing data on 15,541 American companies between 1982 and 2011, concluded that the relationship between NWC size and performance is non-monotonic (non-linear): the relationship is negative for companies with positive working capital surplus and positive for companies with negative working capital surplus. They also noted that companies that are able to operate in a situation of working capital shortage significantly increase their

[1] The cash conversion cycle is the difference between the period of freezing cash in inventories (inventory cycle) and short-term receivables (receivables cycle) and the period of settling current liabilities (liabilities cycle) (Łobos, Szewczyk, 2012: 59).

investments in fixed assets. Their research also showed that companies should strive for an optimal level of working capital, as a decrease (increase) in positive (negative) working capital surplus by one standard deviation is associated with an increase in return on equity of 0.90% (0.85%) over the course of a year (Aktas et al., 2015). A similar inverted U-shaped relationship was also obtained by Baños-Caballero et al., who analysed the relationship between the size of NWC and company performance expressed by Tobin's Q ratio (Baños-Caballero et al., 2014).

Research methods used

The working capital strategy can be identified using various financial indicators, and the literature on the subject does not indicate a single universal method. In general, however, in order to properly determine a given approach to working capital management, absolute measures should not be used, and selected financial indicators should be compared with their average values in the industry. Table 1 presents the most commonly used measures for assessing the NWC strategy (Czapiewski & Kubiak, 2008).

Table 1

Working capital strategy identification indicators

Synthetic indicators		
Indicator name	**Indicator value in relation to the benchmark**	**Strategy type**
Share of NWC in total assets	higher	Conservative
	equal	Moderate
	lower	Aggressive
Current liquidity ratio liquidity	higher	Conservative
	equal	Moderate
	lower	Aggressive
Liquidity ratio Accelerated	higher	Conservative
	equal	Moderate
	lower	Aggressive
Cash cycle	higher	Conservative
	equal	Moderate
	lower	Aggressive
Analytical indicators		
Indicator name	**Indicator value relative to benchmark**	**Strategy type**
Share of current assets in total assets	higher	Conservative
	equal	Moderate
	lower	Aggressive
Share of current liabilities	lower	Conservative

Analytical indicators		
Indicator name	**Indicator value relative to benchmark**	**Strategy type**
in total assets	equal	Moderate
	higher	Aggressive
	higher	Conservative
Share of inventories in current assets	equal	Moderate
	lower	Aggressive
	higher	Conservative
Share of receivables in current assets	equal	Moderate
	lower	Aggressive
	higher	Conservative
Share of cash in current assets	equal	Moderate
	lower	Aggressive
	lower	Conservative
Share of trade liabilities in total assets	equal	Moderate
	higher	Aggressive
	higher	Conservative
Share of long-term liabilities in total assets	equal	Moderate
	lower	Aggressive
	higher	Conservative
Equity share in total assets	equal	Moderate
	lower	Aggressive
	higher	Conservative
Inventory cycle	equal	Moderate
	lower	Aggressive
	lower	Conservative
Receivables cycle	equal	Moderate
	higher	Aggressive
	lower	Conservative
Commitment cycle	equal	Moderate
	higher	Aggressive

Source: Own study based on Czapiewski & Kubiak, 2008: 26–33.

Correctly identifying NWC strategies is not an easy task, as in some cases the selected measures may indicate the use of completely different strategies. The use of analytical indicators allows for better identification of the factors shaping a particular management approach, but may lead to incorrect assessment. The use of synthetic measures greatly simplifies the identification of strategies, but does not provide much cognitive value for the analysed phenomenon. Therefore, researchers should first base their research on general indicators for identifying NWC, which partly allows them to exclude the problem of using multi-criteria methods (Czapiewski & Kubiak, 2008: 28).

Evaluation of the net working capital strategy of LPP S.A.

LPP is a Polish joint-stock company with 30 years of experience in the industry. It designs and distributes clothing. It manages a total of five brands: Reserved, Sinsay, House, Cropp, Mohito. It employs approximately 33,000 people. It has stores in 28 countries on three continents and conducts online sales in 34 countries. Its shares are included in indices such as: WIG20, WIG20TR, WIG Odzież, MSCI Poland Index, CECE index and FTSE Russell Index.

In 2023, the retail sale of clothing (PKD 47.71) and footwear and leather goods (PKD 47.72) sectors comprised a total of 1,828 entities and generated sales revenue of PLN 56.8 billion. LPP S.A. and comparable companies had an average market share of 27% and 7.5%, respectively, in the period from 2019 to 2023 (Bizraport.pl). The “clothing and cosmetics” sector listed on the Warsaw Stock Exchange comprises 22 entities, which in 2023 generated PLN 31.5 billion in sales revenue. The company under review and benchmark companies recorded revenues of PLN 17.4 billion and PLN 3.8 billion, respectively, during this period. As a result, LPP S.A. has significant bargaining power with suppliers and enjoys high brand recognition (StockWatch.pl).

An analysis of the data in Table 2 shows that LPP S.A. is the leader on the Polish clothing market in terms of profitability. Only in 2021 did the company have a lower return on assets than the largest players in the industry, which was mainly due to high investments. During this period, the company increased its fixed assets by 25.04% (from PLN 5,621 million to PLN 7,028 million), which translated into a 31.5% increase in store space (from 1,435.4 thousand m² to 1,888.1 thousand m²). LPP S.A. is gradually increasing its market share and is characterised by high revenue growth, which, excluding data from 2020, averages 24.4% per annum (revenue growth from PLN 9,222 million to PLN 17,406 million).

Table 2

Profitability ratios of LPP S.A. and comparable companies (PP) in 2019–2023

Specification	2019	2020	2021	2022	2023
ROE (LPP) [%]	14.9	−6.2	29.1	27.5	34.2
ROE (PP) [%]	6.7	−10.3	19.7	14.1	8.0
ROA (LPP) [%]	5.1	−1.8	6.8	8.5	11.7
ROA (PP) [%]	4.2	−3.2	9.1	7.9	5.7
ROS (LPP) [%]	5.3	−2.4	8.4	6.8	9.3
ROS (PP) [%]	3.3	−2.8	7.8	6.7	4.0

Source: Own research based on EMIS.

In 2020, the clothing industry was one of the areas of the economy most affected by the negative effects of the COVID-19 pandemic. The negative profitability of the sector, apart from the necessity to close brick-and-mortar stores, resulted from a collapse in demand, the deteriorated financial situation of customers, and disruptions in supply chains, which had a negative impact on the continuity of operational processes and forced entities to focus on maintaining financial liquidity. During this period, LPP recorded relatively better profitability thanks to the rapid development of its e-commerce channel (106.3% increase in online sales revenue), renegotiation of rental costs and a temporary reduction in salary costs (a decrease of 20 to 30%). Strong diversification of activities, accelerated deliveries from China and offering products in a moderate price range meant that LPP was less exposed to the negative effects of the pandemic. In 2021, despite problems with cotton supplies and high inflation, LPP achieved higher profitability compared to 2019 and 2021, which was mainly the result of so-called deferred demand. High customer interest allowed the company to increase its sales volume and achieve a high trading margin (57.8%), which was 5.7 percentage points higher than in the previous year. The decline in LPP's profitability in 2022 was dictated by the war in Ukraine, a decline in demand, an unfavourable dollar exchange rate and the strong growth of the Sinsay brand, which is classified as value-for-money. During this period, the company ceased its operations in Russia and lost a market that accounted for 19.1% of its total revenue. An 8.3% increase in revenue and a 9.3% decrease in operating costs resulted in LPP achieving record profitability on sales, assets and capital in 2023. An ROE of 34.2% means that the company generated 34.2 groszy of net profit from every zloty of equity capital invested.

Almost all of the values in Table 3 indicate that LPP pursued an aggressive NWC strategy during the period under review. Current liquidity ratios suggest that the company was exposed to the risk of losing financial liquidity in 2019–2023 (the optimal ratio is 1.2–2)[2]. Similar conclusions can be drawn based on the quick liquidity ratio (desired value 1–1.2). However, the company was ready to repay its most due liabilities, as evidenced by the cash liquidity ratio (optimal value 0.1–0.2), comparable companies at the current liquidity level in 2019, 2021 and 2023 were characterised by high excess liquidity, and the large differences between current and quick liquidity indicate that LPP managed its inventories much better. The sector's excess liquidity is most evident at the cash liquidity level. LPP has significantly improved its cash management over the last three years. The decrease in the NWC (also in relation to sales revenue) in the period 2021–2023 compared to 2019 indicates that the

[2] The authors of the study took the optimal values of static liquidity ratios from the following studies (Sierpińska & Jachna, 2007: 145–153; Gabrusewicz, 2014: 327–338; Nowak, 2014: 222).

company was exposed to a high risk of losing liquidity and may have had problems related to disruptions in sales continuity.

Table 3

Financial liquidity ratios of LPP S.A. and comparable companies (PP) in 2019–2023

Specification	2019	2020	2021	2022	2023
Share of NWC in total assets (LPP) [%]	5.7	5.2	1.5	2.8	1.3
Share of NWC in total assets (PP) [%]	26.9	18.6	24.3	23.9	26.8
Current liquidity (LPP)	1.17	1.13	1.03	1.07	1.03
Current liquidity (CL)	2.23	1.83	2.04	1.91	2.29
Quick ratio (LPP)	0.57	0.64	0.47	0.42	0.49
Quick ratio (PP)	0.99	0.62	0.76	0.60	0.88
Cash liquidity (LPP)	0.43	0.31	0.20	0.09	0.19
Cash liquidity (PP)	0.28	0.31	0.45	0.28	0.41

Source: Own research based on EMIS.

Table 4 presents the calculated activity ratios of LPP S.A. and comparable companies in 2019-2023. The cash cycle indicates that the company managed its working capital aggressively. Negative values of the indicator show that LPP needed significantly less net working capital than other entities in the industry, as it received payment for goods sold even before settling its current liabilities.

Table 4

Activity ratios of LPP S.A. and comparable companies (PP) in 2019–2023

Specification	2019	2020	2021	2022	2023
Cash cycle (LPP) [days]	−44.6	−85.4	−88.1	−19.7	−37.8
Cash cycle (PP) [days]	77.6	27.2	35.6	48.4	47.3
Inventory cycle (LPP) [days]	76.0	96.5	124.4	76.9	63.8
Inventory cycle (PP) [days]	105.0	144.7	125.1	134.8	112.8
Receivables cycle (LPP) [days]	6.0	12.1	9.0	23.0	17.0
Receivables cycle (PP) [days]	62.7	61.4	51.4	43.4	35.4
Liability cycle (LPP) [days]	126.6	194.0	221.5	119.5	118.6
Liability cycle (PP) [days]	90.1	178.9	140.9	129.8	100.8

Source: Own research based on EMIS.

Throughout the entire period analysed, LPP S.A. did not excessively freeze its funds in inventories and managed them aggressively. Since 2021, the company has improved the efficiency of its inventory management and in 2023 shortened its inventory cycle by approximately 12 days compared to 2019, which had a positive impact on its financial liquidity. In 2020, LPP was the first in the fashion industry to introduce RFID (electronic tag) technology, which, together with a modified warehouse system, significantly reduced costs and increased the availability of the product range for customers by approximately 13%. LPP's receivables cycle in 2023 lengthened by approximately 11 days compared to 2019, which could have had a negative impact on its liquidity level. However, an analysis of industry indicators shows that LPP managed its short-term receivables much better and thus required less working capital. In 2019–2023, the company took a conservative approach to its customer financing policy. The liability cycle indicates that LPP took a dynamic approach to managing its short-term financing sources during the period under review. The long repayment cycle for current liabilities in 2020 and 2021 may suggest that the company had problems with timely settlement. However, given its high profitability ratios and large market share, it can be concluded that LPP has an established position, which gives it considerable leverage in negotiating the repayment of its liabilities. In addition, the company secures its financial liquidity on an ongoing basis by using reverse factoring and multi-purpose credit lines.

LPP actively manages its working capital and is ready at any time to optimise its entire supply chain and implement a just-in-time strategy. This is possible thanks to strong diversification and the use of intermodal transport. The company has supply channels on three continents, and the value of deliveries from any of its approximately 1,200 contractors does not exceed 5% of the total value of its product range.

Table 5 presents the share of individual sources of financing in total assets. The short-term debt ratio also indicates that LPP managed its current liabilities dynamically. It took the most aggressive approach in 2021, when the ratio was more than 13 p.p. higher than that of comparable companies. The capital structure ratio confirms that in 2019–2023, LPP sought to maximise the benefits of financial leverage (optimal value 33%–43%) and pursued a dynamic strategy. Unfortunately, from 2020 to 2022, it was heavily dependent on external financing, which could have had a significant negative impact on the cost of raising funds. The interest cost growth rate on loans and bonds from 2020 onwards was 145%, 117.6%, 398.3% and 79.4%, respectively. The level of long-term debt indicates that LPP took a conservative approach to its NWC strategy. During the analysed period, this measure was on average 40 percentage points lower than the overall debt ratio. This situation may indicate an inappropriate financing structure[3]. However, the specific nature of the sector (average current liabilities of 34.1%) determines a lower involvement of long-term financing.

Table 5

Financing structure ratios of LPP S.A. and comparable companies (PP) in 2019–2023

Specification	2019	2020	2021	2022	2023
Short-term debt ratio (LPP) [%]	33.3	40.3	48.7	40.4	41.0
Short-term debt ratio (PP) [%]	27.8	35.7	35.3	37.7	33.7
Long-term debt ratio (LPP) [%]	32.9	30.1	28.2	28.8	24.9
Long-term debt ratio (PP) [%]	23.7	19.1	14.3	10.5	9.2
Capital structure ratio (LPP) [%]	33.8	29.6	23.1	30.8	34.1
Capital structure ratio (PP) [%]	48.4	45.2	50.3	51.7	57.1

Source: Own research based on EMIS.

Between 2019 and 2023, LPP S.A. dynamically managed its working capital and achieved higher profitability than benchmark companies. The aggressive NWC strategy was identified on the basis of liquidity ratios, cash cycle, inventories and short-term liabilities, as well as the share of current liabilities and equity in the financing structure. A similar relationship is confirmed by the results of studies by R. Sobczyk (2008), R. Duggal and M.C. Budden (2015), E. Oruc and M. Sen (2009), K. Łobos and M. Szewczyk (2012), M. Deloof (2003), A. Bieniasz and Z. Gołaś (2011) and H. Nobanee and A.E. Haddad (2014).

Clothing companies generally receive immediate payment for goods sold. Therefore, it is difficult to define a strategy for receivables policy, and the receivables cycle may have very little impact on performance. Based on the cash liquidity ratio, no significant correlation can be observed either, and its value could have been largely determined by the cash conversion cycle.

Summary

The research conducted confirmed the thesis that LPP S.A., as a commercial enterprise, pursued an aggressive net working capital management strategy in the years 2019–2023. The analysed company is an entity in a good financial condition, which increases the wealth of its shareholders through high investments. It has strong bargaining power vis-à-vis suppliers, which has a significant positive impact on its ability to shape its working capital. A dynamic approach to management has allowed LPP to generate higher profitability than the industry

[3] The long-term debt ratio is a more detailed version of the total debt ratio and should not differ significantly from its value (Nowak, 2014: 254).

average. This strategy has increased the risk of losing financial liquidity. However, the company was able to settle its current liabilities on time. LPP's current liquidity ratios show that fixed capital fully covered fixed assets, and the negative cash cycle also allowed them to be financed with short-term liabilities. Therefore, LPP is able to increase the aggressiveness of its strategy, provided that it maintains high inventory turnover and continuity of procurement processes. In addition, in order to increase its efficiency, the company should (1) continue to expand into Western markets, (2) strengthen its supply channels in the EU, and (3) further develop brands that generate higher trade margins.

The period from 2019 to 2023 was a difficult time for the entire economy. The COVID-19 pandemic and the war in Ukraine caused, among other things, disruptions in supply chains, the need to renegotiate commitments, and an increase in the risk and costs of operations. The situation affected even companies operating in the same industry to varying degrees, which significantly hindered the proper assessment of the NWC strategy. Furthermore, the economic and financial analysis tools used did not allow for: determining the optimal level of NWC, confirming its non-linear relationship with profitability, and taking into account many important factors affecting the level of profit achieved. For these reasons, the authors of the study decided to select comparable entities that were as similar as possible to LPP S.A. in terms of the type of business activity and factors determining the level of working capital (size, age, revenue, risk, legal form, main area of business activity). Therefore, it is recommended to continue research using statistical and econometric methods, and also using a larger sample of companies from the commercial sector – companies listed on stock exchanges in Europe. Future research will also take into account the relationship between NWC strategy and other financial indicators.

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FACTORS AFFECTING ONLINE PURCHASE BEHAVIOR OF CONSUMERS IN BANGLADESH

ABSTRACT

The study explored the attributes that affect consumers' online purchase behavior in Bangladesh. Thirty-one attributes grouped into five categories (Product, Price, Accessibility & convenience, Company website, and Quality issues) are considered in the study. A questionnaire survey of 219 online shoppers has been conducted using non-probabilistic convenient sampling techniques. Foremost attributes noted are buying unavailable products, quality assurance, time saving, selective product purchase, and payment method. Other important factors include delivery time, discounts, geographical accessibility, size/ quantity assurance, response time, flexible shopping hours, and a wide range of product availability. Apart from these there are refund policy, warranty issues, delivery cost, salespeople behavior, relatively high price of certain products, satisfactory delivery system, and inventory availability. The least significant factors include activity of online store pages, smart filtering, and privacy. On the other hand, the non-agreeable significant attributes are personal relationships with owners, availability of used products, and no face-to-face interaction. It is noted that the respondents' financial risk avoidance is emphasized by their considerations of payment method, discounts, refund policy, warranty issues, delivery cost, high price. As per group indices, the most influencing group in online purchases is quality issues, closely followed by product, accessibility & convenience and price. Comparatively, a less important group is company websites meaning that the consumers are not technophobic.

Keywords: accessibility, convenience, price, product, quality, webstore

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1. Introduction

The Internet has brought a sweeping revolution in consumer shopping behavior (Katawetawaraks & Wang, 2011). With the advent of Internet, online shopping (also known as e-tail or e-shopping) has become popular in the 90s and most preferred by certain consumer segments for products like cosmetics, books, music, gadgets, etc. (Swaminathan, et al., 1999; Mauldin & Arunachalam, 2002). Though the internet penetration online shopping highly evolved in developed nations, in Bangladesh, online business is still not prevalent (Khatun et al., 2020). However, with the fast pace of digitalization, online retails are rising in number, as well as the number of online products. Some major e-commerce websites in Bangladesh include Daraz (general), Chaldal (groceries), Pickaboo (electronics), and Rokomari.com (books). Other popular platforms are Othoba.com, Evaly, Priyoshop, and Ajkerdeal. These sites offer a wide range of products and services, from electronics and fashion to groceries and books.

Internet shopping has become a popular means in the online world beginning this century (Javadi et al., 2004). Consumers through online shopping can directly buy products using an internet supported web browser. It also provides consumers with more information and choices to compare product and price, more convenient as it is easier to find most things online (Reibstein, 2002). Online shopping is found to provide more satisfaction to consumers seeking convenience and speed (Jayasubramanian et al., 2015). This novel type of shopping brings a great number and wide range of merchandise to consumers, offers a huge market and numerous business opportunities (Guo & Noor, 2011). On the other hand, lack of trust in terms of quality and size, for instance, seems to be the major concern that impedes several consumers from buying online (Gefen et al., 2003; Kim et al., 2008).

People mostly like continuity in their daily lives, including their shopping routine. While the online shopping offers consumers a wide breadth and depth of product offerings, it also requires them to go outside their normal shopping routine (Jusoh & Ling, 2012). Online shoppers need to learn new technology skills to search, evaluate and acquire products. Online shopping innovativeness is a function of attitude towards the online environment and individual personal characteristics (Monsuwe´ et al., 2004). Innovative consumers are more inclined to try new activities, like online shopping. It is expected that person’s domain specific innovativeness has a propensity to shop online (Nysveen & Pedersen, 2004; Kim et al., 2008).

The Internet came late to Bangladesh with the country gaining connectivity in 1996. In the last few years, it has grown considerably (Enam et al., 2024). With approximately 77.36 million Internet users in 2024, representing a 44.5% penetration rate, the local internet industry has been preparing to move into the next stage of its development. On the demand side, consumers are time pressed. With more consumers becoming increasingly familiar with the internet and its benefits, online shopping is gaining popularity and preference among the consumers, irrespective of gender, who seek better value propositions when compared to brick-and-mortar shopping in terms of information, convenience, cost, and choice (Raman, 2014). Besides, youngsters today love to experiment with new ways of shopping which has also led to the popularity and growth of online shopping (Khatun et al., 2020).

The widespread use of the Internet in Bangladesh has let users carry out numerous online activities today and of those, online purchase, has become prominent. Worldwide, researchers have been trying to find out why consumers tend to buy online products, what factors influence them, and what they look for when buying an online product (Lim et al., 2016). These studies have a major contribution to the e-commerce world, which has been emerging largely. Since Bangladeshi consumers are increasingly interested in online purchase, it is important to understand what affects their online purchase behavior. In that context, this study on factors that affect consumers' online purchase behavior is an important and timely effort for consumers, marketers, and policy makers.

2. Objectives

The broad objective of the study is to explore the factors that influence online purchase behavior of consumers. Specifically, the study tried to find out how product, price, accessibility, convenience, quality and web-based factors affect online consumer buying behavior. In addition, the study also identified impact of demographic features on online buying behavior of consumers.

3. Literature Review

3.1. Online shopping attitude

Online shopping attitude refers to a consumer's psychological state in terms of making online purchases (Bellmen et al., 1999). Online shopping consists of five steps like those associated with traditional shopping behavior. In the typical online shopping process, when potential consumers recognize a need for some merchandise or service, they turn to the internet and search for need-related information. However, rather than searching actively, at times potential consumers are attracted by information about products associated with the felt need. They evaluate alternatives and choose the one that best fits their criteria for meeting the felt need. Finally, a transaction is conducted, and post-sales services are provided.

Koufaris (2002) tested factors which come from information systems, marketing and psychology in one model. Pavlou (2003) studied interrelationships between consumer acceptance of e-commerce and trust, risk, perceived usefulness, and perceived ease of use. Pavlou and Fygenson (2006) examined consumer's adoption of e-commerce with the extended theory of planned behavior. In these research models, consumer behavior was found to be influenced by trust and perceived risk, consumer's attitude, social influence, personal online skills, and technology-oriented factors including perceived usefulness, perceived ease of use and web site features. Also, studies have revealed that online buying behavior is affected by demographics, channel knowledge, perceived channel utility and shopping orientations (Luthuli, 2025).

Studies have revealed that attitude towards online shopping is a significant predictor of making online purchases and purchasing behavior (Lim et al., 2016). Clemons et al. (2016) found that the attributes like convenience, accessibility of global brands, attractive rates and offers, had a significant relationship with attitude toward online shopping. Childers et al. (2001) analysis found that convenience and navigations were reliable predictors of ease of use, and shopping enjoyment. Besides, enjoyment is a strong and consistent predictor of attitude in terms of interactive shopping. It has been found that Planned Behavioral Control (PBC)[1] directly affects online shopping behavior and has a strong relationship with actual Internet purchasing (Ashwini & Manjula, 2016).

3.2. Online purchase intentions

Online consumer behavior has become a contemporary research area with an increasing number of studies. Novak et al. (1999) identified that factors like product varieties, mismatch between actual and delivered products, sense of intangibility have impact on intention to online purchase. Reibstein (2002) stated that delivery time and search time are the prime factors that affect intention to buy online, and negotiation is another factor which makes greater impact on online shopping. Some research revealed that demographic features have positive influences on purchase intention (Bellman et al., 1999; Raman, 2014).

Nysveen and Pedersen (2004) found that intention to purchase online depends on factors like time saving, less travel of distance, easy payment, customization of products, etc. Mauldin and Arunachalam (2002) identified that certain attributes like long delivery time, speed of the internet, more searching time for a specific product, no negotiation are closely related to intention to purchase the products online. Other studies also revealed that attributes like less variety, anytime shopping, physical evidence have impact on online purchase intention.

3.3. Brick-and-mortar versus online stores

Compared to physical stores, online stores have numerous advantages. They are convenient and time saving and do not require traveling. They are always open and accessible. These stores provide consumers with free and rich information about products. They also have some online tools to help consumers compare and make purchase decisions among various products (Luarn & Lin, 2003). Today online consumers have more control and bargaining power than consumers of physical stores because the internet offers more interaction between consumers and product providers as well as greater availability of information about products.

Hoffman and Novak (1996) claimed that the internet shifted the balance of power in favor of consumers as it became easy for them to make comparisons and evaluate alternatives without being pressurized by salespeople. Online stores reduce transaction costs and have advantages for both consumers and vendors. However, online stores also have disadvantages compared to brick-and-mortar stores. In online stores, customers cannot use any senses regarding the product they see on the internet (seeing, touching, tasting, smelling, and hearing) as they search for and purchase products. In online stores, consumers may develop low trust and perceive elevated risk highly because of the lack of face-to-face communication (Gefen et al., 2003).

3.4. Perceived risks

Before purchasing a product, a consumer considers the various risks associated with the purchase. Research suggests that consumers generally prefer to use electronic commerce for purchasing products that do not require physical inspection (Pavlou, 2003). The higher the perceived experience risk, the higher the chances are that the consumer will shift to brick-and-mortar retailers for the purchase of the product and vice versa (Novak et al., 2000). Risks, perceived or real, exist due to technological failure (e.g., breaches in the system) or human error (e.g., data entry mistakes). The most frequently cited risks associated with online shopping include financial risk (e.g., credit card information safety), product risk (e.g., product quality assurance), convenience (e.g., order, return of the merchandise), and non-delivery risk (e.g., product not delivered). The level of uncertainty surrounding the online purchasing process influences consumers' perceptions regarding the perceived risks.

4. Methodology

The research made use of both primary and secondary data and pertinent literature review. Primary data is collected through a structured self-administered questionnaire by surveying 219 online product purchasers of Bangladesh (significance level of 5%, precision ± 6.7%, proportion 0.5). Non-probabilistic convenient and judgmental sampling technique is used to identify the respondents. The secondary data used includes journal articles, reports, and books. A coordination schema is developed focusing on study parameters, complex variables (5), simple variables (32) and values (Appendix 1). Based on the coordination schema the questionnaire is drafted. The questionnaire is designed focusing on the online purchase attributes that affect purchase behavior of the respondents in statement form to rank their perceived concurrence in a 5-point Likert scale (1: Strongly disagree, 2: Disagree, 3: Indifferent, 4: Agree, and 5: Strongly agree). The questionnaire is pretested with 12 respondents for identifying and editing any ambiguous or redundant questions.

The scope of the research is confined to online purchasers of different demographics in Bangladesh. Most responses have been collected from social media pages and social media groups where large numbers of online consumers are found. They were given self-administered questionnaires through Google forms. Other responses include those who agreed to respond to our interview. The questionnaire maintains high face validity in the sense that the questions and options logically relate to the parameters they are supposed to measure. The responses are found reliable (Cronbach's Alpha = 0.787) and consistent. The analysis made use of descriptive and inferential statistics (i.e., T-tests, Chi-square, ANOVA, correlation, regression and factor analysis).

5. Analysis and Findings

5.1. Respondent profile and their online purchase conduct

Demographic features

The sample respondents are quite diverse in terms of gender, age, occupation, and income. Of the 219 respondents, 114 were male (52.1%) and 105 females (47.9%). The average age of the respondents is 22.16 years with standard deviation of 5.40 years (Range is 13~69). The age is skewed to right (skewness = +6.4) and quite steep (kurtosis = 52.4). Occupation wise 176 (80.4%) are students, 31 (14.2%) are service holders, 8 (3.7%) are job seekers and 4 (1.8%) are homemakers. Of the total respondents, 8 (4.2%) had monthly income of more than Tk. 100,000 ($ 833.33), 18 (7.9%) had monthly income between Tk. 50,000–100,000 ($ 416.67 – $ 833.33), 19 (40.4%) had between Tk. 25,000–50,000 ($ 208.33 – $ 416.67), 63 (36.0%) had monthly income between Tk. 10,000–25,000 ($ 83.33 – $ 208.33), and 111 (7.6%) of the respondents had a monthly income less than Tk. 10,000 ($ 83.33). The average income of the respondents is Tk. 21,625 ($ 180.21).

Frequency of online purchases

The frequency of online purchases of the respondents is found to be quite low (Table 1). Most of the purchases are made once a month (18.7%), once in three months (23.7%), once in six months (17.4%), or once a year (26.0%). In few cases purchases are made twice a month (7.8%), or more than twice a month (6.4%). This indicates that online purchases are still in an introductory stage and not yet popular. Also, the reduced purchase frequency can be linked with online financial risk avoidance.

Table 1

Frequency of online purchases

Online purchase	Frequency	%
More than twice a month	14	6.4
Twice a month	17	7.8
Once a month	41	18.7
Once in 3 months	52	23.7
Once in 6 months	38	17.4
Once a year	57	26.0
Total	219	100.0

Types of purchased products

The study found that fashion accessories (e.g., watches, bags, wallets, belts, sunglasses, etc.) are the main online purchased products (49.32%) (Table 2). Next to the list are clothing (37.44%), electronic gadgets (28.77%), cosmetics (26.03%), and books (12.79%). Other purchased items include food items, dildos, etc.

Table 2

Types of purchased products

Types of online purchased products	Frequency	%
a) Cosmetics	57	26.03
b) Clothing	82	37.44
c) Fashion accessories (e.g., watch, bag, wallet, belt, sunglasses, etc.)	108	49.32
d) Electronics gadgets	63	28.77
e) Books	28	12.79
f) Others (Food, Dildos, etc.)	15	6.85
Total respondents	219	100.00

Price range of purchased products

The price range of products purchased (in each purchase) varies from Tk. 500 ($ 4.17) to Tk. 2,000 ($ 16.67) plus (Table 3). In majority cases (38.4%) the purchase varies from Tk. 500 ($ 4.17) to Tk. 1000 ($ 8.33), followed by Tk. 1000 ($ 8.33) to Tk. 1500 ($ 12.50) (24.2%). But in quite a few cases it varies from Tk. 1500 ($ 12.50) to Tk. 2000 ($ 16.67) (14.2%) and above Tk. 2000 ($16.67) (16.0%). In a few cases the price range is below Tk. 500 ($ 4.17). All these suggest that the online consumers of Bangladesh are tuned to small retail purchases rather than big expensive ones to minimize financial risks.

Table 3

Price range of purchased products

Online purchase price range	Frequency	%
a) price range < Tk. 500 ($ 4.17)	16	7.3
b) Tk. 500 ($ 4.17) ≤ price range < Tk. 1000 ($ 8.33)	84	38.4
c) Tk. 1000 ($ 8.33) ≤ price range < Tk. 1500 ($ 12.50)	53	24.2
d) Tk. 1500 ($ 12.50) ≤ price range < Tk. 2000 ($ 16.67)	31	14.2
e) Tk. 2000 ($16.67) ≤ price range	35	16.0
Total	219	100.0

5.2. Factors influencing online purchase behavior

The respondents are given 32 online shopping attributes (31 specific and 1 overall) in statement form in the questionnaire to rank their perceived concurrence in a 5-point Likert scale (1: Strongly disagree, 2: Disagree, 3: Indifferent, 4: Agree, and 5: Strongly agree). These 31 simple variables are again grouped into five categories (complex variables). In this section analysis of the online shopping influencing factors is made based on simple variables, complex variables, and responses by different demographic groups.

5.2.1. Analysis of simple variables

As noted above, there are 32 online shopping related attributes (31 specific and one overall) in the study. The mean responses of these attributes vary from 2.26 to 4.08, implying that the respondents have concurrences between low (2) and strong (4) regarding these factors (Table 4). The findings show that the mean indices of 26 of the variables are 3 (Indifferent) or above, and 6 variables have values below 3. Further, it is noted that 23 attributes (22 specific and one overall) of 26 of the variables with values 3 or above have indices significantly different from 3 (Indifferent) at 5% level. On the other hand, three of the six variables with means below 3 are significantly different from 3 at 5% level.

From the significantly agreed attributes the most important ones (μ ≥ 3.67) are i) Buy certain products that are not available locally (4.08), ii) Quality assurance (4.04), iii) Time saving (4.04), iv) Selective types of product purchase (4.02), v) Payment method (4.01), vi) Delivery time (3.86), vii) Availability of discounts (μ = 3.82), viii) Geographical accessibility (3.75), ix) Size assurance (3.74), x) Response time (3.74), xi) Flexibility of shopping hours (μ = 3.72), and xii) Wide range of products (μ = 3.72). Importance wise next in the list (3.67 > μ ≥ 3.33) are i) Refund policy (3.60), ii) Warranty issues (3.56), iii) Delivery cost (μ = 3.53), iv) Behavior of salespeople (μ = 3.48), v Relatively high price of certain products (μ = 3.45), vi) Satisfactory delivery system (3.41), and vii) Availability of inventory (μ = 3.35).

From the responses it appears that the respondents perceive that online shopping genuine foreign products are available. They also think that the purchased products are quality assured. Time saving is an important factor that affects online shopping decisions. Payment convenience is another factor that they have highlighted. On the other hand, the least important significant factors (μ < 3.33) are i) Frequency of activity of online store pages (μ = 3.31), ii) Smart filtering (μ = 3.29), and iii) Privacy (μ = 3.25). On the other hand, the significant non-agreeable attributes are i) Personal relationships with owners (2.81), ii) Availability of used products (μ = 2.64), iii) No face-to-face interaction (2.26). These findings also have shown consumers' financial concerns in online shopping by emphasizing payment methods, discounts, refund policy, delivery cost, and high price.

The factors not significantly different from 3 (indifferent) are i) tracking of delivery status (3.12), ii) Lack of bargaining power (μ = 3.10), iii) Festivals (μ = 3.0), iv) Relatively low price of certain products (μ = 2.98), and v) Phone application interface (2.96). Also, it can be noted that the response regarding overall satisfaction (μ = 3.47) and mean of the 31 variables (μ = 3.26) are quite consistent and significant. The detailed analysis is as follows.

Table 4

One-sample statistics of the simple variables

Factors influencing online purchase decision	μ	σ	Sig.	Factors influencing online purchase decision	μ	σ	Sig.
1) Buy certain products that are locally unavailable	4.08	1.150	0.000	17) Relatively high price of certain products	3.45	1.201	0.000
2) Time saving	4.04	1.035	0.000	18) Satisfactory delivery system	3.41	0.901	0.000

Factors influencing online purchase decision	µ	σ	Sig.	Factors influencing online purchase decision	µ	σ	Sig.
3) Quality assurance	4.04	1.035	0.000	19) Availability of inventory	3.35	1.120	0.000
4) Selective types of product purchase	4.02	1.018	0.000	20) Frequency of activity of online store pages	3.31	1.162	0.000
5) Payment method	4.01	1.081	0.000	21) Smart filtering	3.29	1.098	0.000
6) Delivery time	3.86	1.004	0.000	22) Privacy	3.25	1.175	0.002
7) Availability of discounts	3.82	1.059	0.000	23) Ability to track delivery	3.12	1.091	0.096
8) Geographical accessibility	3.75	1.089	0.000	24) Lack of bargaining power	3.10	1.230	0.228
9) Size/Weight assurance	3.74	1.142	0.000	25) Festivals	3.00	1.287	0.958
10) Response time	3.74	1.051	0.000	26) Relatively low-price of certain products	2.98	1.137	0.812
11) Flexible shopping hours	3.72	1.142	0.000	27) Phone application interface	2.96	1.091	0.621
12) Wide range of products	3.72	1.093	0.000	28) Wide range of prices	2.89	1.117	0.132
13) Refund policy	3.60	1.220	0.000	29) Personal relationships with owners	2.81	1.361	0.038
14) Warranty issues	3.56	1.149	0.000	30) Availability of used products	2.64	1.216	0.000
15) Delivery cost	3.53	1.190	0.000	31) No face-to-face interaction	2.26	1.234	0.000
16) Behavior of salespeople	3.48	1.224	0.000	32) Overall satisfied with online shopping	3.47	0.869	0.000

5.2.2. Analysis of complex group variables

Thirty one simple variables are grouped into five categories: i) Product related, ii) Price related, iii) Accessibility & convenience, iv) Online web-based factors, and v) Quality issues (Table 5). It is found that the most important group (mean index wise) is quality issues ($\mu = 3.61$), closely followed by product related attributes ($\mu = 3.57$), accessibility & convenience ($\mu = 3.54$) and price related attributes ($\mu = 3.33$) groups. The respondents are indifferent to online web-based factors ($\mu = 2.98$). Mean index of five groups is found to be 3.41 ($\mu = 3.41$, $\sigma = 0.26$, $\alpha = 0.03$) which is consistent with overall satisfaction of the respondents ($\mu = 3.47$, $\sigma = 0.87$, $\alpha = 0.00$). Group wise analysis is given below.

Table 5

Grouping variables

Group variables	μ	σ	Sig.	Group variables	μ	σ	Sig.
Product related	**3.57**	**0.48**	**0.02**	**Accessibility & Convenience**	**3.54**	**0.40**	**0.01**
1) Purchase certain locally unavailable products	4.08	1.15	0.00	1) Geographical accessibility	3.75	1.09	0.00
2) Purchase selective types of products	4.02	1.02	0.00	2) Flexible shopping hours	3.72	1.14	0.00
3) Wide range of products	3.72	1.09	0.00	3) Satisfactory delivery system	3.41	0.90	0.00
4) Availability of inventory	3.35	1.12	0.00	4) Ability to track delivery status	3.12	1.09	0.10
5) Availability of used products	2.64	1.22	0.00	5) Payment method	4.01	1.08	0.00
6) Product refund policy	3.60	1.22	0.00	6) Smart filtering	3.29	1.10	0.00
7) Product warranty issues	3.56	1.15	0.00	7) Time saving	4.04	1.04	0.00
Price related	**3.33**	**0.39**	**0.13**	8) Festivals	3.00	1.29	0.96
1) Relatively high price of certain products	3.45	1.20	0.00	**Quality issues**	**3.61**	**0.43**	**0.02**
2) Relatively low-price of certain products	2.98	1.14	0.81	1) Quality assurance	4.04	1.04	0.00
3) Wide range of prices	2.89	1.12	0.13	2) Size/Weight assurance	3.74	1.14	0.00
4) Delivery cost	3.53	1.19	0.00	3) Response time	3.74	1.05	0.00
5) Availability of discounts	3.82	1.06	0.00	4) Delivery time	3.86	1.00	0.00
Online web-based factors	**2.98**	**0.42**	**0.91**	5) Behavior of salespeople	3.48	1.22	0.00
1) Frequency of activity of online store pages	3.31	1.16	0.00	6) Personal relationships with owners	2.81	1.36	0.04
2) Phone application interface	2.96	1.09	0.62	**Mean Index of 5 groups**	3.41	0.26	0.03
3) Privacy	3.25	1.18	0.00	**Overall**			
4) No face-to-face interaction	2.26	1.23	0.00	1) Overall satisfied with online shopping	3.47	0.87	0.00
5) Lack of bargaining power	3.10	1.23	0.23				

Product In a product group there are seven product related variables. All of them are found important factors except one (availability of used products). Importance wise variables in this group are i) buy certain locally unavailable products (μ = 4.08), ii) purchase selective types of products (μ = 4.02), iii) Wide range of products (μ = 3.72), iv) refund policy (μ = 3.60), v) warranty issues (μ = 3.56), and vi) availability of inventory (μ = 3.35). The study noted that availability of used products (μ = 2.64) has negative impact on online purchases. The mean index of the product group is found to be 3.57.

Price In a price group there are five simple variables. Three of them have mean values above 3 (Indifferent) and two have mean values below three. Importance wise variables in this group are i) availability of discounts (μ = 3.82), ii) delivery cost (μ = 3.53), iii) relatively high price of certain products (μ = 3.45), iv) relatively low price of certain products (μ = 2.98), and vi) wide range of prices (μ = 2.89). As noted, discounts, delivery costs, high/low prices, price range appear to be most important for online purchases implicating financial brunt on online shoppers. The mean index of the product group is found to be 3.33.

Accessibility & convenience The third group of accessibility & convenience has eight simple variables. All of them have values 3 or above. Importance wise variables in this group are i) Time saving (4.04), ii) Payment method (4.01), iii) Geographical accessibility (3.75), iv) Flexibility of shopping hours (μ = 3.72), v) Satisfactory delivery system (3.41), vi) Smart filtering (μ = 3.29), vii) tracking of delivery status (μ = 3.12), and festivities (μ = 3.0). The mean index of the product group is found to be 3.54.

Online web-based factors The group of online web-based factors have five simple variables. Three of them have mean values above 3 (Indifferent) and two have mean values below three. Importance wise variables in this group are i) Frequency of activity of online store pages (μ = 3.31), ii) Privacy (μ = 3.25), iii) Lack of bargaining power (3.10), iv) Phone application interface (μ = 2.96), and v) No face-to-face interaction (2.26). The mean index of the online web-based factors group is found to be 2.98. As noted, the factors in this group do not have much impact on online purchases meaning the respondents are not technophobic.

Quality issues The quality issues group appears to be the most significant of the five categories. This group has six variables. All of them are found important factors except one (Personal relationships with owners). Importance wise variables in this group are i) Quality assurance (4.04), ii) Delivery time (3.86), iii) Size assurance (3.74), iv) Response time (3.74), v) Behavior of salespeople (μ = 3.48), and vi) Personal relationships with owners (2.81). The mean index of the online web-based factors group is found to be 3.61. Also, it can be noted that the response regarding overall satisfaction (μ = 3.47) and mean of the five group variables (μ = 3.41) are quite consistent and significant.

5.2.3. Demographic Analysis of the responses

The study has considered the impact of demographic factors on consumer purchase decisions. The demographic features considered include gender, age, income and occupation.

Gender The analysis of gender-wise response difference noted that only in four cases a significant response difference is found at 5% level. These are i) Geographical accessibility (μ_{female} = 3.53, μ_{male} = 3.96), ii) Behavior of salesperson (μ_{female} = 3.73, μ_{male} = 3.25), iii) Relationship with owners (μ_{female} = 3.00, μ_{male} = 2.63), and iv) Festivals (μ_{female} = 3.27, μ_{male} = 2.76). As noted above, females are more positive regarding behavior of salesperson, relationship with owners, and festivals, but they are less concerned regarding geographical accessibility. Overall, it can be said that gender wise much response difference is not noted.

Age A correlation analysis is conducted between age and the 32 variables. The analysis noted that in seven cases a significant relationship is found at 5% level (Table 6). These are i) Quality assurance (r = −0.184), ii) Delivery time (r = −0.168), iii) Delivery cost (r = −0.141), and iv) Availability of discounts (r = −0.134), v) Wide range of products (r = −0.166), vi) Products not available locally (r = −0.188), and vii) Selective products purchase (r = −0.146). In each case a negative weak correlation is observed. In these cases, also some financial implications can be observed, especially regarding delivery cost and discount. Hence, it can be said that with age, in seven cases, the response level goes down.

Table 6

Correlation between age and the factors

Factor	r	Sig.	Factor	r	Sig.
1) Quality assurance	−0.184	0.006	1) Wide range of products	−0.166	0.014
2) Delivery time	−0.168	0.013	2) Products not available locally	−0.188	0.005
3) Delivery cost	−0.141	0.037	3) Selective products purchase	−0.146	0.031
4) Availability of discounts	−0.134	0.047			

Income A correlation analysis is conducted between income and the 32 variables. The analysis noted that in six cases a significant relationship is found at 5% level (Table 7). These are i) Lack of bargaining scope (r = −0.162), ii) Relatively high price of certain products (r = −0.150), iii) Behavior of salespersons (r = −0.157), iv) Tracking of delivery status (r = −0.145), v) Availability of used products (r = −0.188), and vi) Activity of online store pages (r = −0.152). In each case a negative weak correlation is observed. It can be noted that high prices of certain products and bargaining scope are concerns for senior consumers, which can have some impact on online shopping environment. Overall, it can be said that the consumers' financial capability has not much influence on online purchase behavior.

Table 7

Correlation between income and the factors

Factor	r	Sig.	Factor	r	Sig.
1) Lack of bargaining scope	−0.162	0.017	4) Tracking of delivery status	−0.145	0.031
2) Relatively high price of certain products	−0.150	0.026	5) Availability of used products	−0.188	0.005
3) Behavior of salespersons	−0.157	0.020	6) Activity of online store pages	−0.152	0.025

Occupation As noted, occupation wise majority of the respondents in the study are students (176, 80.37%) and service holders (31, 14.16%). Hence, the study tried to see if there is any mean response difference between these two groups. It is noted that only in four cases the mean response difference is observed. These are: i) Flexibility of shopping hours ($\mu_{student} = 3.69$, $\mu_{service} = 4.26$), ii) Response time ($\mu_{student} = 3.70$, $\mu_{service} = 4.06$), iii) Availability of used products ($\mu_{student} = 2.71$, $\mu_{service} = 2.19$), and iv) Smart filtering ($\mu_{student} = 3.22$, $\mu_{service} = 3.74$). Overall, it can be said that occupation wise much mean response difference is not noted.

6. GROUPING BY FACTOR ANALYSIS

6.1. Factor Analysis

Factor analysis[2] is conducted on the data to select grouping of variables under common premises. The result grouped the 31 variables into 11 factors that explained 64.15% of the total variance (Table 8). The factor analysis of 31 variables with 219 sample[3] is found adequate (KMO = 0.679 ≥ 0.5) and valid (Bartlett's test of sphericity significance level = 0.000). The communalities[4] of the variables that constitute the factors, are found to be very strong, which indicates strong relationships among the variables (Appendix 2).

Table 8

Total Variance Explained

Factors	Initial Eigenvalues		
	Total	Variance (%)	Cumulative %
1) Responsiveness & Accessibility	4.615	14.886	14.886
2) Product-price range	2.858	9.219	24.105
3) Warranty terms	2.042	6.586	30.691

Factors	Initial Eigenvalues		
	Total	Variance (%)	Cumulative %
4) Conformance	1.757	5.667	36.358
5) Exceptional cases	1.538	4.963	41.321
6) Courtesy & Convenience	1.363	4.398	45.719
7) Time efficiency	1.270	4.098	49.817
8) Unique products	1.185	3.824	53.641
9) Flexibility & Convenience	1.163	3.751	57.392
10) Confidentiality/ No peer pressure	1.066	3.438	60.830
11) Privacy	1.029	3.318	64.148

The high factors loadings [5] in each of the 11 factors show a strong correlation between the factors and the corresponding variables (Table 9). As noted, the first factor (Responsiveness & Accessibility) consists of five of thirty one variables and appears to be the most important as it explains 14.886% of the variability. The second important factor (Product-price range) explains 9.219% of the variability and consists of five variables. The third one (Warranty terms) consisting of two variables explains 6.586% of the variability. The fourth (Conformance), fifth (Exceptional cases), sixth (Courtesy & Convenience) and seventh (Time efficiency) factor explain 5.667%, 4.963%, 4.398%, and 4.098% respectively. The remaining factors explain very little variability. Further it is noted that the variables under eleven factors and the variables under six groups (complex variables) formed in the schema are quite similar and consistent.

Table 9

Factors with corresponding variables

Factors with variables (σ^2)	Factor loading	Factors with variables (σ^2)	Factor loading
Factor 1: Responsiveness & Accessibility (σ^2 = 14.886%)		**Factor 6: Courtesy & Convenience (σ^2 = 4.398%)**	
1) Response time	0.739	1) Behavior of salespeople	0.674
2) Delivery time	0.735	2) Payment method	0.633
3) Geographical accessibility	0.596	3) Lack of bargaining scope	−0.627

Factors with variables (σ^2)	**Factor loading**	**Factors with variables (σ^2)**	**Factor loading**
4) Delivery cost	0.492	**Factor 7: Time efficiency (σ^2 = 4.098%)**	
5) Tracking of delivery status	0.490	1) Time saving	0.732
Factor 2: Product & price range (σ^2 = 9.219%)		2) Smart filtering	0.724
1) Wide range of prices	0.710	**Factor 8: Unique products (σ^2 = 3.824%)**	
2) Wide range of products	0.651	1) Certain products that are unavailable locally	0.682
3) Availability of discounts	0.532	2) Selective types of product purchase	0.645
4) Availability of inventory	0.508	**Factor 9: Flexibility & Convenience (σ^2 = 3.751%)**	
5) Frequency of activity on online store pages	0.407	1) Flexibility of shopping hours	0.700
Factor 3: Warranty terms (σ^2 = 6.586%)		2) Satisfaction with delivery system	0.670
1) Warranty issues	0.850	**Factor 10: Confidentiality/ No peer pressure (σ^2 = 3.438%)**	
2) Refund policy	0.841	1) No face-to-face interaction	0.843
Factor 4: Conformance (σ^2 = 5.667%)		**Factor 11: Privacy (σ^2 = 3.418%)**	
1) Size assurance	0.822	1) Privacy	0.693
2) Quality assurance	0.713	2) Certain products have relatively low price	−0.638
3) Relatively high price of certain products	0.581	Notes:	
Factor 5: Exceptional/Unique cases (σ^2 = 4.963%)		Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 11 iterations.	
1) Festivals	0.710		
2) Personal relationship with owners	0.656		
3) Availability of used products	0.620		
4) Phone application interface	0.466		

6.2. Regression Analysis with Factors

Factor analysis has identified eleven factors as independent variables. Associated with these factors are thirty one variables which independently affect the overall satisfaction level of online purchase decisions. A regression analysis (both enter and stepwise method) is conducted taking these factors as the independent variable and the "Overall satisfaction of online purchase" as the dependent one (Table 10). The model is found significant (0.000) with an adjusted r^2 of 23.4%. Regression factors 1, 3, 5, 6, 11 are found insignificant at 5% level. One factor has a negative coefficient (Factor 4). Coefficientwise the contributory factors in descending order are 9 (0.325), 8 (0.158), 7 (0.146), 10 (0.137), 2 (0.125), and 4 (−0.112).

Table 10

Regression model with eleven factors

REGR factor	Factor labels	Coefficients	Standardized Coefficients	Significance (p-value)
(Constant)		3.466	–	0.000
REGR factor score 1	Responsiveness & Accessibility	0.009	0.010	0.867
REGR factor score 2 *	Product-price range	0.125	0.144	0.016
REGR factor score 3	Warranty terms	−0.025	−0.029	0.628
REGR factor score 4 *	Conformance	−0.112	−0.129	0.031
REGR factor score 5	Exceptional cases	−0.001	−0.001	0.985
REGR factor score 6	Courtesy & Convenience	−0.076	−0.088	0.139
REGR factor score 7 *	Time efficiency	0.146	0.168	0.005
REGR factor score 8 *	Unique products	0.158	0.182	0.002
REGR factor score 9 *	Flexibility & Convenience	0.325	0.374	0.000
REGR factor score 10 *	Confidentiality/ No peer pressure	0.137	0.158	0.008
REGR factor score 11	Privacy	0.017	0.020	0.737
N.B.: Dependent variable: Overall satisfaction, * Significant at 5% level				

7. Summary, Conclusions and Recommendations

Despite being heavily popular worldwide, the number of online businesses in Bangladesh is still very low in number. The paper tried to identify the factors affecting consumers' online purchase decisions. Specifically, the study tried to find out how product, price, accessibility, convenience, quality and online store websites affect online consumer buying behavior. The research made use of both primary and secondary data and pertinent literature review. Primary data is collected through a structured self-administered questionnaire by surveying 219 online product purchasers of Bangladesh. Non-probabilistic convenient and judgmental sampling technique is used to identify the respondents.

A coordination schema is developed focusing on study parameters, complex variables (5), simple variables (32) and values. Based on the coordination schema the questionnaire is drafted focusing on the online purchase influencing attributes in a 5-point Likert scale (1: Strongly disagree, 2: Disagree, 3: Indifferent, 4: Agree, and 5: Strongly agree). The questionnaire maintains high face validity in the sense that the questions and options logically relate to the parameters they are supposed to measure. The responses are found reliable (Cronbach's Alpha = 0.787) and consistent. The analysis made use of descriptive and inferential statistics. T-tests, Chi-square, ANOVA, correlation, regression and factor analysis are used in the study.

Out of the 219 respondents, 114 were male (52.1%) and 105 females (47.9%). The average age of the respondents is 22.16 years. Occupation wise 176 (80.4%) are students, 31 (14.2%) are service holders, 8 (3.7%) are job seekers and 4 (1.8%) are homemakers. Out of the total number of respondents, 8 (4.2%) had monthly income of more than Tk. 100,000 ($ 833.33), 18 (7.9%) had monthly income between Tk. 50,000–100,000 ($ 416.67 – $ 833.33), 19 (40.4%) had between Tk. 25,000–50,000 ($ 208.33 – $ 416.67), 63 (36.0%) had monthly income between Tk. 10,000–25,000 ($ 83.33 – $ 208.33), and 111 (7.6%) of the respondents had a monthly income less than Tk. 10,000 ($ 83.33). The average income of the respondents is Tk. 21,625 ($ 180.21).

The frequency of online purchases of the respondents is found to be quite low. Most of the purchases are made once a month (18.7%), once in three months (23.7%), once in six months (17.4%), or once a year (26.0%). In few cases purchases are made twice a month (7.8%), or more than twice a month (6.4%). This indicates that online purchases are still in an introductory stage and not yet popular. The study found that fashion accessories (e.g., watches, bags, wallets, belts, sunglasses, etc.) are the main online purchased products (49.32%). Next to the list are clothing (37.44%), electronic gadgets (28.77%), cosmetics (26.03%), and books (12.79%). Other purchased items include food items, dildos, etc.

The price range of products (in each purchase) varies from Tk. 500 ($ 4.17) to Tk. 2,000 ($ 16.67) +. In majority cases (38.4%) the purchase varies from Tk. 500 ($ 4.17) to Tk. 1000 ($ 8.33), followed by (24.2%) Tk. 1000 ($ 8.33) to Tk. 1500 ($ 12.50). But in quite a few cases (14.2%) it varies from Tk. 1500 ($ 12.50) to Tk. 2000 ($ 16.67) and above Tk. 2000 ($ 16.67)

(16.0%). In a few cases the price range is below Tk. 500 ($ 4.17). All these aspects suggest that the online consumers of Bangladesh are tuned to small retail purchases rather than big expensive ones.

The respondents are given thirty two online shopping attributes (31 specific and 1 overall) in a statement form to rank their perceived concurrence in a 5-point Likert scale (1: Strongly disagree, 2: Disagree, 3: Indifferent, 4: Agree, and 5: Strongly agree). The mean responses of these attributes vary from 2.26 to 4.08, implying that the respondents have concurrences between low (2) and strong (4) regarding these factors. The mean indices of twenty six variables are 3 (Indifferent) or above and 6 variables have values below 3. Further, it is noted that twenty three of the attributes (22 specific and one overall) of 26 of the variables with values 3 or above have indices significantly different from 3 (Indifferent) at 5% level. On the other hand, three of the six variables with means below 3 are significantly different from 3 at 5% level.

Our of the significantly agreed attributes the most important ones ($\mu \geq 3.67$) are i) Buy certain products that are not available locally (4.08), ii) Quality assurance (4.04), iii) Time saving (4.04), iv) Selective types of product purchase (4.02), v) Payment method (4.01), vi) Delivery time (3.86), vii) Availability of discounts ($\mu = 3.82$), viii) Geographical accessibility (3.75), ix) Size assurance (3.74), x) Response time (3.74), xi) Flexibility of shopping hours ($\mu = 3.72$), and xii) Wide range of products ($\mu = 3.72$). Importance wise next in the list ($3.67 > \mu \geq 3.33$) are i) Refund policy (3.60), ii) Warranty issues (3.56), iii) Delivery cost ($\mu = 3.53$), iv) Behavior of salespeople ($\mu = 3.48$), v) Relatively high price of certain products ($\mu = 3.45$), vi) Satisfactory delivery system (3.41), and vii) Availability of inventory ($\mu = 3.35$).

From the responses, it appears that the respondents perceive that genuine foreign products are available in online shops and the products are quality assured. Time saving is an important factor that affects online shopping decisions. Payment convenience is another factor that they have highlighted. On the other hand, the least important significant factors ($\mu < 3.33$) are i) Frequency of activity of online store pages ($\mu = 3.31$), ii) Smart filtering ($\mu = 3.29$), and iii) Privacy ($\mu = 3.25$). On the other hand, the significant non-agreeable attributes are i) Personal relationships with owners (2.81), ii) Availability of used products ($\mu = 2.64$), iii) No face-to-face interaction (2.26).

The factors not significantly different from 3 (indifferent) are i) tracking of delivery status (3.12), ii) Lack of bargaining power ($\mu = 3.10$), iii) Festivals ($\mu = 3.0$), iv) Relatively low price of certain products ($\mu = 2.98$), and v) Phone application interface (2.96). Also, it can be noted that the response regarding overall satisfaction (μ = 3.47) and mean of the thirty one variables (μ = 3.26) are quite consistent and significant.

Thirty one simple variables are grouped into five categories: i) Product, ii) Price, iii) Accessibility & convenience, iv) Online web-based factors, and v) Quality issues. It is found that mean index wise the most important group is quality issues (μ = 3.61), closely followed by product (μ = 3.57) and accessibility & convenience (μ = 3.54) groups. Comparatively less important groups are price (μ = 3.33) and online web-based factors (μ = 2.54).

In a product group all the seven product related variables are found important factors except one, (availability of used products). Importance wise variables in this group are i) buy certain locally unavailable products (μ = 4.08), ii) purchase selective types of products (μ = 4.02), iii) Wide range of products (μ = 3.72), iv) refund policy (μ = 3.60), v) warranty issues (μ = 3.56), and vi) availability of inventory (μ = 3.35). The study noted that availability of used products (μ = 2.64) has negative impact on online purchases.

In a price group there are five simple variables. Three of them have mean values above 3 (Indifferent) and two have mean values below three. Importance wise variables in this group are i) availability of discounts (μ = 3.82), ii) delivery cost (μ = 3.53), iii) relatively high price of certain products (μ = 3.45), iv) relatively low price of certain products (μ = 2.98), and vi) wide range of prices (μ = 2.89). As noted, discounts appear to be most important for online purchases.

The third group, accessibility & convenience, has eight simple variables and all of them have values 3 or above. Importance wise variables in this group are i) Time saving (4.04), ii) Payment method (4.01), iii) Geographical accessibility (3.75), iv) Flexibility of shopping hours (μ = 3.72), v) Satisfactory delivery system (3.41), vi) Smart filtering (μ = 3.29), vii) tracking of delivery status (μ = 3.12), and festivities (μ = 3.0).

The group of online web-based factors have five simple variables. Three of them have mean values above 3 (Indifferent) and two have mean values below three. Importance wise variables in this group are i) Frequency of activity of online store pages (μ = 3.31), ii) Privacy (μ = 3.25), iii) Lack of bargaining power (3.10), iv) Phone application interface (μ = 2.96), and v) No face-to-face interaction (2.26). As noted, the factors in this group do not have much impact on online purchases.

The quality issues group appears to be the most significant of the five categories. This group has six variables. All of them are found important factors except one (Personal relationships with owners). Importance wise variables in this group are i) Quality assurance (4.04), ii) Delivery time (3.86), iii) Size assurance (3.74), iv) Response time (3.74), v) Behavior of salespeople (μ = 3.48), and vi) Personal relationships with owners (2.81Also, it can be noted that the response regarding overall satisfaction (μ = 3.47) and mean of five group variables (μ = 3.41) are quite consistent and significant.

The gender-wise response difference noted that in only four cases a significant response difference is found. These are i) Geographical accessibility (μ_{female} = 3.53, μ_{male} = 3.96), ii) Behavior of salesperson (μ_{female} = 3.73, μ_{male} = 3.25), iii) Relationship with owners (μ_{female} = 3.00, μ_{male} = 2.63), and iv) Festivals (μ_{female} = 3.27, μ_{male} = 2.76). Here, females are found more positive regarding behavior of salesperson, relationship with owners, and festivals, but they are less concerned regarding geographical accessibility. Overall, it can be said that gender wise much response difference is not noted.

Correlation between age and the variables (32) noted that in seven cases a negative weak significant relationship is found. These are i) Quality assurance (r = −0.184), ii) Delivery time (r = −0.168), iii) Delivery cost (r = −0.141), and iv) Availability of discounts (r = −0.134), v) Wide range of products (r = −0.166), vi) Products not available locally (r = −0.188), and vii) Selective products purchase (r = −0.146). Hence, it can be said that with age the response level goes down.

Correlation between income and the variables (32) noted that in six cases a negative weak significant relationship is found. These are i) Lack of bargaining scope (r = −0.162), ii) Relatively high price of certain products (r= −0.150), iii) Behavior of salespersons (r = −0.157), iv) Tracking of delivery status (r = −0.145), v) Availability of used products (r = −0.188), and vi) Activity of online store pages (r = −0.152). Hence, it can be said that with increase in income the response level goes down.

As noted, occupation wise majority of the respondents in the study are students and service holders. Hence, the study tried to see if there is any mean response difference between these two groups. It is noted that only in four cases the mean response difference is observed. These are: i) Flexibility of shopping hours ($\mu_{student}$ = 3.69, $\mu_{service}$ = 4.26), ii) Response time ($\mu_{student}$ = 3.70, $\mu_{service}$ = 4.06), iii) Availability of used products ($\mu_{student}$ = 2.71, $\mu_{service}$ = 2.19), and iv) Smart filtering ($\mu_{student}$ = 3.22, $\mu_{service}$ = 3.74). Overall, it can be said that occupation wise much mean response difference is not noted.

The study found that the respondents' financial risk avoidance is accentuated by their reflections of payment method, discounts, refund policy, warranty issues, delivery cost, and high price. As noted, discounts, delivery costs, high/low prices, price range appear to be most important attributes for online purchases implicating financial brunt on online shoppers. Also, the reduced purchase frequency can be linked with online financial risk avoidance. In addition, small retail purchases rather than big expensive ones lead to minimizing financial risks for the consumers. The study has considered the impact of demographic factors (i.e., gender, age, income and occupation) on consumer purchase decisions. Age wise, some financial implications, especially delivery cost and discount are observed. It is noted that high prices of certain products and bargaining scope are concerns for senior consumers, which can have some impact on online shopping environment.

Factor analysis is conducted on the data to group the variables under common premises. The results showed that thirty one variables are grouped into eleven factors explaining 64.15% of the total variance. The factor analysis of thirty one variables with 219 sample is found adequate and valid. The communalities of the variables that constitute the factors are found to be very strong, which indicates strong relationships among the variables. The high factor loadings in each of the eleven factors show a strong correlation between the factors and the corresponding variables.

As noted, the first factor (Responsiveness & Accessibility) consists of five of thirty one variables and appears to be the most important as it explains 14.886% of the variability. The second important factor (Product-price range) explains 9.219% of the variability and consists of five variables. The third one (Warranty terms) consisting of two variables explains 6.586% of the variability. The fourth (Conformance), fifth (Exceptional cases), sixth (Courtesy & Convenience) and seventh (Time efficiency) factor explain 5.667%, 4.963%, 4.398%, and 4.098% respectively. The other factors explain very little variability. Further, it is noted that the variables under eleven factors and the variables under five groups (complex variables) formed in the schema are quite similar and consistent.

Notes

1. Planned/Perceived Behavioral Control (PBC) refers to an individual's perception of the ease or difficulty of performing a specific behavior. It is a key factor, along with attitude and subjective norms, in determining a person's intention to engage in a behavior and can also directly influence the behavior itself.
2. Factor Analysis is a type of analysis used to discern the underlying dimensions or regularity in a phenomenon. Its general purpose is to summarize the information contained in many variables into a smaller number of factors. It is an interdependence technique in which all variables are simultaneously considered.
3. Ideally the sample size should be at least 150 (subject to variable ratio greater than 5). The factor analysis of 31 variables with 219 samples is found adequate (KMO test result = $0.679 \geq 0.5$) and valid (Bartlett's test of sphericity indicates a significance level of 0.000).
4. Communality refers to a measure of the percentage of a variable's variation that is explained by the factors. It is the amount of variance an original variable shares with all other variables included in the analysis. A relatively higher communality indicates that a variable has much in common with the other variables taken as a group.
5. 'Factor Loading' is a measure of the importance of the variable in measuring each factor. It is used for interpreting and labeling a factor. It is the correlation between the original variables and the factors, and key to understanding the nature of a factor.

APPENDICES

Appendix I

Coordination Schema

Parameter	Complex variable	Simple variable	Value
Factors that influence consumers' online purchase decision	Product related	1) Purchase certain locally unavailable products	Likert Scale
		2) Purchase selective types of products	
		3) Wide range of products	
		4) Availability of Inventory	
		5) Availability of used/refurbished product	
		6) Warranty Issues	
		7) Refund Policy	
	Price related	1) Relatively high price of certain product	Likert Scale
		2) Relatively low price of certain product	
		3) Wide range of prices	
		4) Delivery cost	
		5) Availability of discounts	
	Online web-based factors	1) Frequency of activity of online store pages	Likert Scale
		2) Phone application interface	
		3) Privacy	
		4) No face-to-face interaction	
		5) Lack of bargaining power	
	Accessibility & Convenience	1) Geographical accessibility	Likert Scale
		2) Flexible shopping hours	
		3) Satisfactory delivery system	
		4) Ability to track delivery status	
		5) Payment method	
		6) Smart filtering	
		7) Time saving	
		8) Festivals	
	Quality issues	1) Quality assurance	Likert Scale
		2) Size/Weight assurance	
		3) Response time	
		4) Delivery time	
		5) Behavior of salespeople	
		6) Personal relationships with owners	
	Overall	Overall satisfaction with online shopping	Likert Scale

Appendix 2

Communalities

Variables	Extraction	Variables	Extraction
1) Lack of Bargaining scope	0.637	17) Payment method	0.637
2) Geographical accessibility	0.568	18) Personal relationship with owners	0.634
3) Quality assurance	0.702	19) Ability to track delivery status	0.559
4) Size assurance	0.726	20) Festivals	0.673
5) Refund policy	0.790	21) Availability of used products	0.459
6) Warranty issues	0.784	22) Frequency of activity of online store pages	0.586
7) Privacy	0.675	23) Wide range of prices	0.640
8) Flexibility of shopping hours	0.693	24) Wide range of products	0.582
9) Relatively high price of certain products	0.544	25) Certain products are unavailable locally	0.639
10) Response time	0.683	26) Time saving	0.645
11) Delivery time	0.667	27) Smart filtering	0.633
12) Delivery cost	0.620	28) Certain products have relatively low price	0.681
13) Phone application interface	0.529	29) No face-to-face interaction	0.745
14) Behavior of salespeople	0.616	30) Selective types of products purchase	0.626
15) Availability of discounts	0.512	31) Satisfaction with delivery system	0.716
16) Availability of inventory	0.686	Extraction Method: Principal Component Analysis.	

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FINTECH, ARTIFICIAL INTELLIGENCE, FINANCIAL RISK AND MACRO-FINANCIAL LINKAGES

ABSTRACT

The purpose of the article. The aim of this paper is to determine the impact of FinTech and Artificial Intelligence (AI) on the relationship between the financial sector and the real economy through the channel of credit. Furthermore, digital technologies, including artificial intelligence, adopted by traditional banks contribute to reshaping the dynamics of financial risk.

Methodology. In the first part, a critical analysis of the literature was conducted. Part Two presents a quantitative research including a panel data analysis based on data from European countries concerning traditional credit and FinTech credit.

Results of the research. A critical analysis of the literature confirms the significant impact of digital technologies on financial products and financial risk. Moreover, a quantitative research indicates the considerable influence of new technologies on the relationship between the financial sector and the real economy. The results suggest that, in European countries, FinTech credit tends to be a substitute for traditional bank credit for households and that AI supports the development of the FinTech credit market in these countries.

Keywords: digital technologies, FinTech credit, AI, financial risk, bank credit, macro-financial linkages

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Introduction

After the global financial crisis of 2008, digital solutions were implemented at a rapid pace to match financial products better to customer needs. New enterprises, known as FinTechs, which are not traditional banks, have emerged in the financial sector. FinTech companies encompass various financial innovations, such as crowdfunding platforms, blockchain, and mobile payment platforms, which have transformed the world of finance and the methods of financing economic entities (FSB, 2024). The basic banking product that connects the financial sector and the real economy is credit. FinTech companies, like banks, can provide credit and loans. At the same time, we are observing an increase in the use of artificial intelligence (AI) in the financial sector (Boobier, 2020; Aldasoro, et. al., 2024; FSB, 2024). Therefore, in this paper, the concept of macro-financial linkages refers to the interaction between the real economy and the financial sector through the credit channel, as well as the role of digitalization in the growth of credit market. The wider use of FinTech and AI in finance has brought transformative benefits to the financial sector but may also exacerbate existing risks (Cornelli et al., 2023; Acharya et al, 2024). Furthermore, by entering the area of activity previously reserved for banks, FinTech companies exert a huge impact on competition in the financial services sector and credit bank market (Pawłowska, 2023).

The aim of this paper is to determine the impact of digital technologies, including Artificial Intelligence (AI), on the relationship between the financial sector and the real economy. Part One, within the framework of a literature review, defines the channels through which new technologies and AI impact traditional banking, lending market, financial risk and real economy. Part Two presents the quantitative method applied for the analyzed role of FinTech credit in European economy. Despite the relevance of the topic, empirical work in this field concerning Europe remains quite scarce. The paper fills a research gap in research on the relationship between the financial sector and the real economy due to digitalization and AI in European banking sector. Similar studies for the global economy were provided by Claessens et al. (2018), based on a simple cross-sectional analysis, and by Cornelli et al. (2023), based on global panel data. The originality of this study lies in the use of a panel regression model for panel data constructed for selected European countries. Furthermore, this paper also examined the relationship between FinTech credit and total credit, divided into credit for households and for corporate clients. Additionally, the research incorporates AI-related variables.

This paper consists of four chapters and a conclusion. The first chapter presents motivation, research questions and hypotheses. The second chapter includes the basic definitions. The third chapter discusses the impact of digitalization and artificial intelligence on the financial sector. The fourth chapter describes the model based on the literature. Finally, the conclusion summarizes the research.

1. Research Questions and Hypotheses

The motivation of this paper is complex and is based on the following phenomena affecting traditional finance: digitalization, FinTech, Artificial Intelligence (AI) and macro-financial linkages. Due to the role of traditional banks in the economy, these phenomena affect their financing and the development of macroprudential policy. The 2008 financial crisis confirmed that deepening knowledge on the relations between the financial sector and real economy was critical (cf. Acharya & Richardson, 2009). Similarly, we have observed the impact of digitalization on financial risk.

It should be noted that FinTech companies provide consumer loans, corporate loans, and mortgage loans (Cornelli et al., 2023; Acharya et al., 2024). Traditional banks aiming to make relations with their customers used to be considered a factor lessening information asymmetry (Stiglitz & Weiss, 1981). Furthermore, when banks tighten credit supply due i.e., economic downturns or risk aversion, FinTech lenders may fill this gap, particularly for underserved segments (Buchak et al., 2018; Cornelli et al., 2023). FinTech companies have a comparative advantage with respect to Big Data using platforms that enable the immediate use of matching lenders and borrowers (i.e., the increasing use of the Internet and platforms has made it possible to match lenders and borrowers directly through peer-to-peer (P2P) lending. Moreover, according to literature a FinTech loan can seem to be a supplement (Tang, 2019) or a substitute for a bank loan (Gopal & Schnabl, 2020). Furthermore, Gamborta et al. (2025) found that AI investments help banks mitigate the typical countercyclical effects of relationship lending on firms' credit supply, as well as on their investment and employment decisions.

When examining the influence of digitalization on the loan market, it should be stressed that the role of large technological companies (BigTechs) is significant (BIS, 2019). BigTech companies operate across multiple business lines, with their core activities typically being non-financial, while lending often constitutes only a small part of their operations. Notably, technology giants such as Amazon, Apple, and Google, which already participate in the lending market, possess significant potential for expanding financial services due to their access to vast amounts of customer data (BIS, 2020). Cornelli, et al. (2023), using a global database of FinTech and BigTech lending volumes for 79 countries over 2013–2018 and applying panel regression analysis, found that these alternative forms of credit are more developed in countries with greater ease of doing business and more advanced bond and equity markets. Furthermore, they concluded that FinTech and BigTech credit tend to complement rather than substitute traditional forms of credit.

Building on these findings, this paper focuses on European countries, primarily within the EU, and additionally examines the role of Artificial Intelligence (AI). The aim of this paper is to answer the following main research question: What is the impact of FinTech and AI on lending markets in European countries?

The following research hypotheses were formulated based on the above question:
H1: Digitalization has an impact on financial risk and traditional banks' performance.
H2: FinTech credit is a substitute for bank credit in European countries.

In case to verify research hypotheses, the empirical model has been contacted based on panel data. Data for individual European countries was obtained from publicly available online databases of international organizations, such as the World Bank, Bank of International Settlement, International Monetary Fund, European Central Bank (Statistical Data Warehouse), Eurostat. Data concerning credit comes from the European Credit Research Institute (ECRI) at the Centre for European Policy Studies (CEPS). Panel data concerning FinTech and FinTech credit was based on data from the papers: Cornelli et al., 2020 and Cornelli et al., 2021.

2. Basic Definitions

The financial sector is changing at a very fast pace, which is largely due to the development of digital technologies. To maintain their market position, traditional banks, which have so far only offered services in physical branches, are now implementing information technology (IT) and Big Data (cf. Nayernia et al., 2022). On the other hand, banks and other financial intermediaries invest in the development of modern technologies, which leads to further technical progress. At the same time, we are observing an increase in the use of Artificial Intelligence (AI) in the banking sector (cf. Boobier, 2020; Nicoletti, 2017).

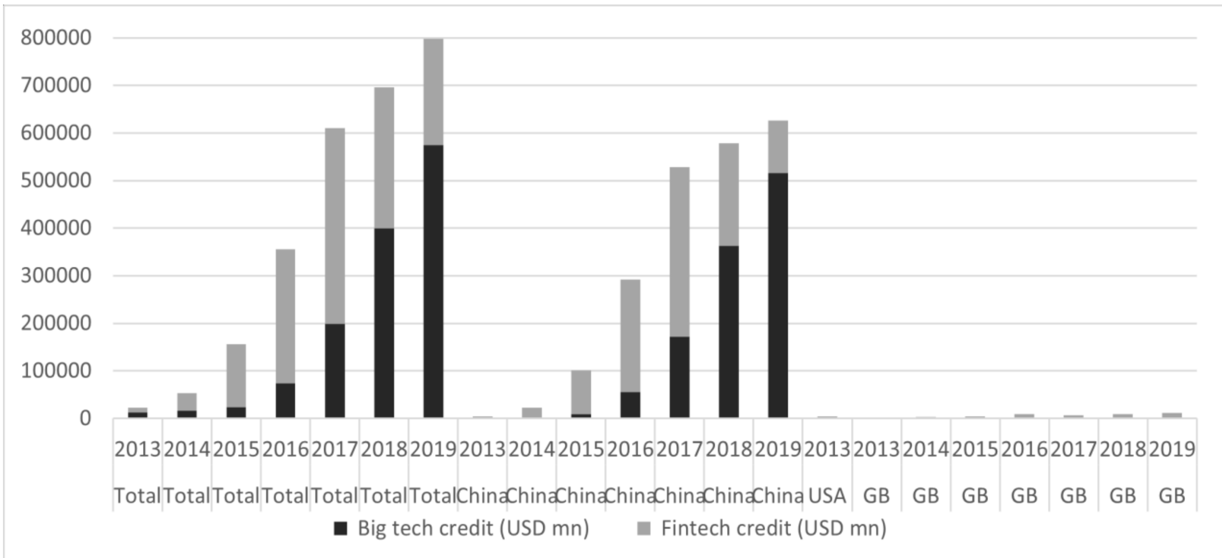
2.1. FinTech: basic definitions

FinTech refers to the integration of digital technology with financial services. FinTech companies filled the existing gaps in the needs of financial service users, which were not met by traditional banks (i.e., speed of service, lower costs, transparency, quick access and security). There is no uniform market definition of FinTech. It is defined by the services and products it co-creates. As the functionality of FinTech-enabled solutions increases, its definition expands. One of the first definitions of FinTech was included in the report of Financial Stability Board (FSB, 2017). This definition presents FinTech as a: "…financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and the provision of financial services". Thakor (2020) defined FinTech as "…part of the process of evolving financial innovation, which has theoretically been shown to be risky but of value, with supporting recent evidence that it yields substantial value to investors" (e.g., Thakor, 2020).

FinTech companies range from small startups to large technology firms (BigTech), whose role in transforming financial services traditionally dominated by banks has been increasing (Scardovi, 2017; Beaumont, 2020; Boobier, 2020; Boot et al., 2021; Sironi 2022). One of the concepts related to the functioning of FinTech companies is FinTech credit (Cornelli & Nicoletti, 2017; Fiore et al., 2023; Acharya et al., 2024). FinTech companies like traditional banks provide consumer loans, corporate loans, and mortgage loans. Claessens et al. (2018) found that loans granted by FinTech are growing rapidly, although they are still small compared to loans granted by traditional intermediaries. FinTech credit broadly includes all credit activity facilitated by non-bank electronic (online) platforms. It may also include credit services provided by large tech firms via their platforms. The provision of loans by the FinTech sector enables a wider access to financing. This approach is in line with the position of the FSB (CGFS-FSB, 2017). However, FinTech companies, firstly, have access to a wider group of customers than traditional banks, and secondly, they provide their customers with additional benefits such as greater convenience in using financial services and, moreover, at lower costs. In addition, players from the BigTech sector offer financial services as part of a much wider set of activities, have a high growth potential and can be great competition for traditional commercial banks (cf. Vivies, 2017, p. 101). The FinTech term refers to enterprises using technological innovations in financial services, while large technology companies (BigTechs) offer financial services as part of their activities, which have a much wider scope (BIS, 2019). Furthermore, the development of artificial intelligence (AI) and its use in the financial system have increased the potential for greater efficiency and profits for FinTech and BigTech companies, as well as traditional banks. Notably, technological giants such as Amazon, Apple and Google, which already operate in the lending market, have a great potential for the development of financial services because they have access to a huge amount of customer data (BIS, 2020, p. 7). Traditional banks collect information on customer credit histories over a long period of time, while BigTech companies can use their advantage on the lending market thanks to non-financial data about their customers and can use this data on a much larger scale in their financial activities (BIS Annual Economic Report, 2019, p. 63; BIS, 2020). Due to the broad definition of FinTech loans, compiling aggregate data is challenging, especially since the time series covering this phenomenon is quite short. Initial estimates based on this data were published in Claessens et al. (2018) and Crisanto et al. (2021). It should be noted that FinTech and BigTech credit dominated mainly in China, USA, Japan, Korea, and the UK (see Figure 1). Although the volume of loans issued by FinTech companies is growing rapidly, it remains relatively small compared to that of traditional financial intermediaries (Claessens et al., 2018).

Figure 1

FinTech and BigTech credit (USD mn)



Source: Own elaboration based on: Cornelli et al., 2020.

In Europe, traditional banks still dominate the financial sector; however, banks are increasingly investing in new technologies and adopting additional distribution channels. Furthermore, traditional commercial banks face competition in the lending market also from new players – the so-called neobanks. Neobanks are financial institutions that may have a banking license, but do not have traditional branches, because they use, inter alia, cloud infrastructure to function better on online, mobile and social platforms. They can obtain banking licenses under the existing regulatory regimes, and it is mainly them who can grant loans, create relationships with customers or have traditional banks as business partners (BCBS, 2018).

2.2. AI: basic definitions

Artificial intelligence (Artificial Intelligence, AI) refers to machines that can think, learn, and make decisions like humans and are broadly defined in the past as computer systems that perform tasks that typically require human intelligence (Turing, 1948, 1950; Russell & Norvig, 2010). However, the concept of AI is broad and changes over time, along with technological advancements. Moreover, distinctions are made between the concepts of artificial intelligence or generative artificial intelligence (GenAI). Currently, under the AI term, there are many concepts including neural networks, robotics, machine learning (ML), and deep machine learning (Aldasoro et al., 2024). Another element is natural language processing (NLP), which is a field of artificial intelligence (AI) that makes human language understandable to machines. Computer Vision (CV) is a field of science and technology that focuses on enabling computers to achieve a high level of understanding of digital images and videos.

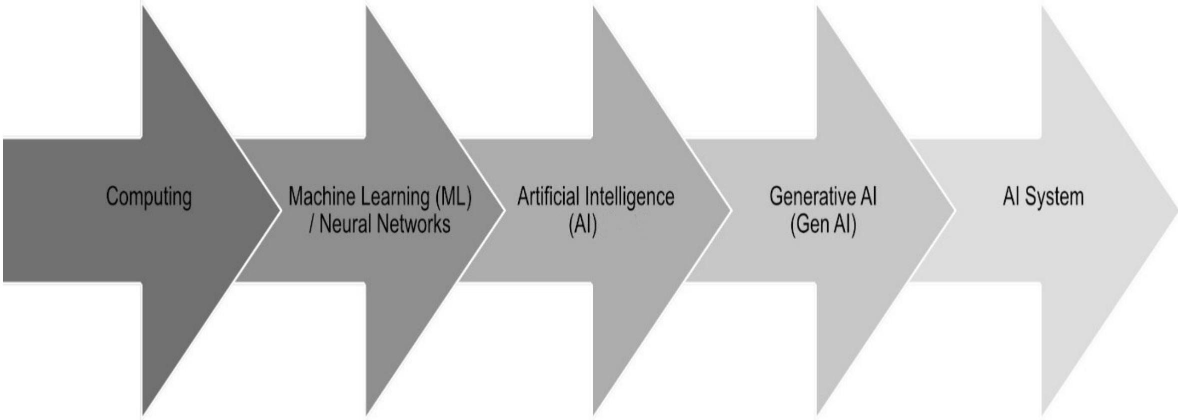
It should be noted that the history of AI is quite long, dating back to the 1930s, when the first works on mathematical logic by Alan Turing (1936) and Kurt Gödel (1931) emerged, which are considered the foundations of AI. In 1955, John McCarthy introduced the term of artificial intelligence to science, defining it as “the science and engineering of making intelligent machines”. The following year, in 1956, he organized a scientific conference at Dartmouth titled Dartmouth Summer Research Project on Artificial Intelligence. This event is considered in the scientific community as the birthplace of the field of science called “artificial intelligence” (see IAPP, 2023). Furthermore, Marvin Lee Minsky constructed the first neural network in 1950, contributing to the development of “artificial intelligence”. For much of the 20th century, AI was using neural network and expert systems that were developed. While highly useful for basic financial functions (e.g., risk management, basic algorithmic trading rules and credit scoring, fraud detection), they were far from human-level abilities in pattern recognition, handling uncertainty and complex reasoning (Ceruzzi, 2003).

Another impulse for the development of AI has been the emergence of so-called large language models (LLMs), which can, among other things, answer ambiguous questions or analyze the sentiment of texts depending on the context. Large language models (LLMs), a type of generative artificial intelligence (GenAI), are being used as information points and as a way to simplify data analysis and reporting on the basis of the firm’s data.

An attempt to identify the definition of AI and AI systems has been made by the OECD (2024a, p. 4). An AI system is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. The definition of AI is contained in the AI principles (Russell & Norvig, 2009; OECD, 2019). However, in an earlier study (OECD, 2023), the OECD attempted to distinguish between the so-called old AI and generative artificial intelligence GenAI (cf. Figure 2).

Figure 2

Development of AI



Source: Own elaboration based on Aldasoro, Gambacorta, Korinek, Shreeti & Stein (2024).

3. The Impact of Digitalization and Artificial Intelligence on financial sector

3.1. FinTech and financial risk

The development of digital technologies has brought innovative changes in the whole financial sector. Additionally, FinTech companies, due to their presence in the credit market, create new challenges and risks and have an impact on macro-financial linkages (Cornelli et al., 2023; Acharya et al., 2024). On the one hand, digitalization has brought benefits to the financial sector. On the other hand, the wider use of FinTech and AI in finance has, but may also exacerbate existing financial risks. Financial risk is a broad concept that includes many types of risks: credit risk, liquidity risk, and operational risk. Generally, financial risk is the possibility of losing money on an investment or a business venture.

Risks associated with the operations of FinTech and Big Tech may be classified at a micro- and macroeconomic level. Microeconomic risks involve, directly or indirectly, possible losses brought on by a loss of funds from financial institutions at the same time due to operational risk, e.g., because of a cyberattack, due to risk inherent in sharing infrastructure, such as cloud services, or due to infractions or failures on account of new solutions that have not been tested yet. Operational risk is on the part of service providers being third persons. External service providers for financial institutions soon grow ever more visible and critical, especially in so-called cloud computing and data services. Since many third-party service providers can cross regulatory limits, greater attention is being shifted to the management of combined operational risks, which may weaken financial stability. Also, transaction risk is on the cryptocurrency market. It is necessary to examine the implications of alternative digital currency configurations for domestic financial systems and the global monetary framework (FSB, 2017).

Macroeconomic risks chiefly pertain to a systemic risk. Systemic risks are of high significance for the macroprudential policy, and they affect the relations between the financial sector and the real economy (FSB, 2017). Systemic risks address the effects of contagion, pro-cyclicality and increasing volatility (Danielsson et al., 2022). Another risk source may arrive along with so-called systemically important institutions. Although cyber risk does not only threaten FinTech, the higher the reliance on digital solutions, but the more access points for hackers also looking for a weak link in the network. BigTechs provide their financial services either competing with the traditional financial institutions or in cooperation, as an overlay on their products and infrastructure. Another risk source may arrive along with so-called systemically important institutions and relates to BigTech companies.

Macro financial risk is connected with pro-cyclicality of FinTech loans. The pro-cyclicality may arise from several sources, including greater concentration in certain market segments (Danielsson et al., 2022). Any assessment of FinTech influence on financial stability, however, is undermined by restricted access of both official, as well as privately disclosed FinTech data. Also, the pro-cyclicality of FinTech loans may arise from financial flows becoming large and unstable i.e. on FinTech credit platforms.

It must be noted that the threats and opportunities from Big Tech affect banking operations differently than those from FinTech (cf. Tanda & Schena, 2019, p. 47). Additionally, BigTechs are actively partnering with and investing in AI startups. Large BigTech companies are leveraging their market power in other markets related to digital technologies and expanding it into emerging artificial intelligence markets. Large tech companies are also heavily investing in artificial intelligence, such as Microsoft’s investment in OpenAI (cf. Aldasoro et al., 2024; Gambacorta & Shreeti, 2025).

3.2. AI on Financial Market

In the current decade, the development of AI accelerated. The use of AI is becoming increasingly interesting for entities in the financial system, seeing in it the potential for increased efficiency and profits. Financial institutions are investing heavily in adopting and implementing AI within their organizations. Traditional banks use AI to improve their services (see FSB, 2019, pp. 3–4). The large spending suggests that financial institutions are expecting to benefit significantly from their AI investments (FSB, 2024).

It should be noted that financial institutions have been using artificial intelligence (AI) for many years, and the risks related to AI are known and managed (FSB, 2024). As an example, of using AI in the banking sector one can give customer support chatbots; fraud detection, including for purposes of anti-money laundering and combating the financing of terrorism (AML/CFT); credit and insurance underwriting. AI can be particularly useful in high-frequency data analysis, creditworthiness assessment procedures, algorithmic trading, as well as other areas of risk management, including monitoring and detection of fraud or counterfeiting (OECD, 2021; OECD, 2023; FSB, 2024; OECD, 2024b).

Artificial intelligence (AI), like most technologies, can bring many benefits, but it can also create risks. Those possible ones in the use of AI relate mainly to cybersecurity (i.e., Aldasoro et al., 2024), and include micro prudential risks, such as credit risk, insurance risk, model risk, operational risks, reputational risks, conduct. Furthermore, there are the risks of AI consumer protection risks and macro risk. Additionally, AI generates macroprudential or financial stability risks. Its use may heighten existing risks, such as a model risk (e.g., the lack of explainability makes it challenging to assess the appropriateness of AI models) and data-related risks e.g., privacy, security, bias (see Crisanto et al., 2024).

AI contributes to strengthening the market power in digitized markets and raise new antitrust issues (for example, it affects competition in the sphere of innovation and will create a new space for collusive pricing or abuse of dominant positions). AI can facilitate collusion, lead to abuse of a dominant position, and reduce a competitive pressure, which creates many challenges for the existing competition policy regime OECD (2023).

Risks in the use of AI also relate to market concentration and distortions of competition (i.e., Gambacorta and Shreeti, 2025). Artificial intelligence is powered by huge amounts of data that require high computing power, and this leads to the risk of concentration on AI product providers to a few dominant companies (OECD, 2021). However, companies utilizing AI may be exposed to third-party risks, e.g., access to data is crucial for the effectiveness of models like LLM, the concentration of data suppliers, such as large technology companies (Big Tech) or other platforms.

According to Gambacorta and Shreeti (2025), a typical AI application consists of hardware, including graphic processors, cloud computing infrastructure, training data for models and AI applications. On the one hand, artificial intelligence requires more data and better hardware. Hardware, on the other hand, requires new sources of energy. Energy use of data centers depends on several parameters, such as the number of computer instances hosted per server, data centers' workloads, power usage effectiveness (processor efficiency and idle power management) or data center storage capacity (OECD, 2021).

The level of development of AI tools and the risk of reliability of the results are limitations in its use for decisions in the financial sector. Trust in artificial intelligence in banking is lower than in comparable sectors (i.e., Aldasoro et al., 2024). Due to fast development of AI, the European Council approved the AI Act, a regulation that addresses issues related to artificial intelligence (May 27, 2024). On August 1, 2024, twenty days after its publication in the EU Official Journal, the AI Act entered into force and is based on risk-based policy approaches and high-risk AI systems.

4. Description of the Model Based on Literature

In this section, the construction of an empirical model that examines the relationship between the bank credit and FinTech credit in European economies based on the literature is presented. However, due to limited availability of data on FinTech credit, the number of scientific studies remains relatively small.

Most of these studies examine the issue on a global scale or focus primarily on the economies of China and the United States. Nevertheless, research results regarding the role of FinTech credit in relation to bank credit or other forms of financing do not provide clear conclusions and yield different outcomes (e.g., Claessens et al., 2018; Tang, 2019; Bao & Huang, 2021; Cornelli et al., 2023). Claessens et al. (2018) found that FinTech credit is negatively correlated with competition in the banking market and the severity of regulation of that market. Furthermore, Tang (2019) found that in the United States, P2P lending is complement for bank lending with respect to small loans. Finally, Cornelli et al. (2023), using global data, found that Fintech and big tech credit complement rather than substitute traditional bank credit.

To answer the research question, we first describe the data and methods used in our empirical research and then present the results of the model. We use a panel regression model (Baltagi, 2005; Wooldridge, 2010), which was estimated with two techniques: pool regression, ordinary least squares (OLS) and panel regression fixed-effects estimator (FE).

4.1. Description of Variables

In order to provide quantitative research the panel data was constructed. The panel data included annual data at the national level for selected European economies. Data in the panel covers the macroeconomic situation (e.g., GDP growth) in individual European economies, the level of concentration in individual banking sectors, the bank performance, digitalization, FinTech companies, FinTech credit and a number of data centers as proxy of AI. Data for individual European countries was obtained from publicly available online databases of international organizations. Data on innovative technologies (including payment services) comes from the International Monetary Fund, the European Central Bank (Statistical Data Warehouse) and Eurostat (data on internet use and mobile telephony). Data concerning banking credit comes from the European Credit Research Institute (ECRI) at the Centre for European Policy Studies (CEPS).[1] Additionally, FinTech variables are from the studies: Cornelli et al. (2020), Cornelli et al. (2021) and AI data from Statista.[2] One limitation of the study is the limited availability of data on FinTech loans, as the publicly available dataset starts in 2013 and ends in 2019, and does not cover all the European Union countries. Due to the restricted data availability regarding FinTech credit, the panel includes data only for the following countries: Austria, Belgium, Bulgaria, the Czech Republic, Germany, Denmark, France, Estonia, Ireland, Spain, Finland, the United Kingdom, Italy, Lithuania, Latvia, the Netherlands, Poland, Portugal, Sweden, Slovakia and Slovenia. Due to a lack of data, the panel was unbalanced.

4.2. The Panel Linear Regression Model

To verify the research hypotheses, the econometric model was constructed based on the literature (i.e., Claessens et al., 2018; Cornelli et al., 2023). The baseline equation aims to examine the role of FinTech credit and digitalization on the credit market. However, the purpose of constructing the equation is to verify whether FinTech credit is a substitute for, or a complement to, bank loans. The equation in the model was estimated using panel data analysis techniques.[3]

Equation (1) represents the output specification of the constructed baseline econometric model based on panel data:

$$\Delta Y_{c,t} = \mu_t + \gamma_c + \alpha_1 MS_{c,t} + \alpha_2 BankL_{c,t} + \alpha_3 GDP_{c,t} + \alpha_4 ROAc,t + \alpha_5 RISKc,t + \alpha_6 DigTech_{c,t} + \alpha_7 FinTechc,t + \alpha_8 AI + \varepsilon_{c,t} \tag{1}$$

where the explained variable $Y_{c,t}$ is FinTech credit variables in country c in year *t*.

[1] The ECRI Statistical Package provides a comprehensive overview of the trends and composition of lending to non-financial corporations and households.

[2] Data center is a network of computing and storage resources that enables the delivery of shared software applications and data.

[3] The model was estimated based on panel data and cross-sectional data using the FE and OLS estimators.

The explanatory variables in the model are:

- $GDP_{c,t}$ defines the macroeconomic situation determined by the GDP growth rate yoy (*GDP*) in country *c* in year *t*;
- $MS_{c,t}$ as indicators of market structure: the share of the five largest credit institutions in total assets ($CR5_{c,t}$) and as the HHI for assets (the sum of the squares of the market share of individual banks[4]), for country *c* in year *t*;
- $BankL_{c,t}$ describes the grow of total loans to non-financial sector; loans for household, loans for corporates for country *c* in year *t*;
- $ROAc,t$ describes return on assts in the banking sector for country *c* in year *t*;
- $RISKc,t$ describes non-performing loans in the banking sector (*NPL*), for country *c* in year *t*;
- $DigTech$ describes the variables concerning the new technology *inside and outside* the banking sector (i.e., Pawłowska & Staniszewska, 2024) in country *c* in year *t*: *INTER* (people of using Internet as % of individuals), *ATM* (number of Automated Teller Machines [ATMs]; *ATM1* (number of Automated Teller Machines per 100 kk2); *MOB* (number of mobile phone subscriptions per 100 people), *card* (the number of payment cards) and *Server* (server number);
- *AI* describes us the number of data and AI centers[5] for country *c* in year *t*;
- $FinTech$ defines variables describing FinTech equity financing in relation to GDP ($FinTech$) for country c in year t; and value of the KFTX Stock Index[6] (*KFTX*) in year t.

Table 1 below presents the definition of variables for the model and summary statistics. In order to select appropriate variables for the model, the correlation between the variables was investigated.[7]

Kouretas and Pawłowska emphasize that the determinants of individual types of credit, which make up total credit, are different (i.e., Kouretas & Pawłowska, 2025). Therefore, additional equations were constructed to examine how the dynamics of various types of credit

[4] The Herfindahl-Hirschman Index (HHI) is calculated as the sum of the squares of each commercial bank's market share (e.g., in net assets). Index values range from 0 to 1, with higher index values indicating higher market concentration.

[5] A data center includes servers, storage systems, networking equipment, cooling systems, and security controls.

[6] KBW Nasdaq Financial Technology Index was created to track the capitalization of innovative companies in the financial sector. A company is included in the index if it provides digital solutions for the financial market (see: Pawłowska & Staniszewska, 2024).

[7] The Spearman's rank correlation between all variables in the model is estimated for the whole sample of model.

affect FinTech credit, divided into credit for households and for corporations. In order to check what the relationship between FinTech credit and credit for households as well as credit for corporates is, equation 2 was constructed. Equation (2) represents the output specification of the constructed econometric model based on panel data:

$$\Delta Y_{c,t} = \mu_t + \gamma_c + \alpha_1 MS_{c,t} + \alpha_{21} BankL\_H_{c,t} + \alpha_{22} BankL\_NFC_{c,t} + \alpha_3 GDP_{c,t} + \alpha_4 ROAc,t + \alpha_5 RISKc,t + \alpha_6 DigTech_{c,t} + \alpha_7 FinTechc,t + \alpha_8 AI + \varepsilon_{c,t} \quad (2)$$

where the explained variable $Y_{c,t}$ is FinTech credit variables in country c in year *t*.

The explanatory variables in the model are:

- $BankLH_{c,t}$ describes the growth of loans for household (L_H) for country *c* in year t;
- $BankLNFC_{c,t}$ describes the growth of loans for corporates (L_NFC) for country *c* in year t.

The remaining explanatory variables are the same as in equation (1).

Based on equation (1), six estimates were made regarding the determinants of FinTech credit: three using the OLS estimator and three using panel data regression (FE). All estimations in the models are estimated separately to avoid any alignment of variables. Table 2 presents the results of the panel regressions coefficients.

In Table 2 the positive and insignificant coefficient α_2 was found for total loans (columns 1, 2, 3, 4, 5, 6). Of course, the variables determining digital technologies had a significant impact on the growth of FinTech credit. However, only, the positive and significant coefficient α_6 was found for the explained variable *INTER* (columns 2 and 5) and Server (column 4). These results suggest that digitalization had a positive impact on FinTech credit in European countries. Interestingly, the concentration (*CR5*) and profitability of banks (*ROA*) proved to be significant and positive for FinTech credit. This result may suggest that lower competition in the banking sector positively affects the attractiveness of alternative sources of financing and FinTech credit. Furthermore, variable *NPL* was significant and negative for FinTech credit. It may mean that a greater credit risk in the banking sector increased a FinTech credit. Finally, AI has a positive impact on FinTech credit (columns 2, 3, 5, 6).

Additional six estimations were made based on equation 2, three using the OLS estimator and three using panel data regression with Fixed Effects (FE). Table 3 presents the results of the tree linear regressions OLS and tree for panel regression FE. In Table 3, the negative and significant coefficient α_{21} was found for loans for household (i.e., columns 1, 3, 4, 5, 6) and the positive and insignificant coefficient α_{22} was found for loans for corporates (columns 1, 2, 3, 5, 6) and the positive and significant in column 4. Like in model 1, only the positive and significant coefficient α_6 was found for the explained variable *INTER* (columns 2 and 5) and Server (columns 1, 3 and 5, 6). Also, concentration (*CR5*) and profitability of banks (*ROA*) proved to be significant and positive for FinTech credit. Furthermore, variable NPL was significant and negative for a FinTech credit. Finally, AI has a positive impact on a FinTech credit (columns 2, 4, 5).

Certainly, the *FinTech* variable had a positive and significant impact on the growth of FinTech credit (Tables 2 and 3).

Table 1

Construction of variables for model and summary statistics of selected European countries

Variable names	Definitions	Nu. of Obs.	Mean	Std. Dev.	MIN	MAX
Banking Variables						
CR5	Share of the 5 largest credit institutions in total assets	196	62.462	18.20	26.18	97.35
HHI	Herfindahl-Hirschman for assets	196	0.1365	0.15673	0.0245	1.3
ROA	Return on assets	196	0.4896	0.78286	−2.55	3.04
ROE	Return on equity	185	3.961	15.7455	−145.53	21.53
NPL	Non-performing loans	193	8.028	9.602	.2131	46.78
Credit Variables						
T_Loans	% annual change in total loans	196	0.0052	0.0979	−0.4384	0.6125
L_H	% annual change in credit for household	196	0.027558	0.06671	−0.3331	0.25603
L_NFC	% annual change in credit for nonfinancial corporation	196	−.0020976	0.07280	−0.2630	0.3102
FinTech Variables						
*FinC***	FinTech credit to GDP	147	13329.09	18448.5	0	46054
*FinTechC***	% annual change in FinTech credit	138	5.6669	5.166	−4.60	5.006
*FinTech**	Fintech equity funding in relation to GDP	175	0.1068	0.4681	0	6.694
KFTX	The value of the KFTX Stock Index	196	1128.053	231.64	849	1434
Economic Growth Variables						
GDP	The gross domestic product growth rate Yoy	196	2.975	2.78129	−1.4	25.1
DigTech Variables						
ATM	Number of Automated Teller Machines (ATMs)	147	14818.11	32002.9	211	86702

Variable names	Definitions	Nu. of Obs.	Mean	Std. Dev.	MIN	MAX
ATM1	Number of Automated Teller Machines per 100 kk2 (ATMs)	147	120.857	132.4635	4.79	687.5
Card	Logarithm of number of credit card	150	1.2384	0.815	0.6632	10.477
INTER	Individuals using the Internet (%)	144	81.833	8.9161	59.5	98.14
MOB	Number of mobile phone subscriptions per 100 people	147	123.5011	15.625	99.45	168.82
Server	Logarithm of number of secure servers	167	9.777	1.2048	4.755	12.532
AI Variable						
AI	Logarithm of Number of data centers	168	3.51941	2.3025	1.4272	6.2709

**Data from studies: Cornelli et al., 2020. * Data from Cornelli et al., 2021, pp. 31–43.

Source: Own calculation based on publicly available online databases of international organizations, such as the World Bank, International Monetary Fund, European Central Bank (Statistical Data Warehouse), Eurostat, Bloomberg. Data concerning credit is from European Credit Research Institute (ECRI) at the Centre for European Policy Studies (CEPS) for banking sectors form Statistical Package 2022, AI variables from Statista.

Table 2

Empirical Results for equation 1

	FinTechC	FinTechC	FinTechC	FinTechC	FinTechC	FinTechC
Variable name	1	2	3	4	5	6
	OLS	OLS	OLS	FE	FE	FE
T_Loans	0.020	0.047	0.017	0.072	0.081	0.020
	(0.055)	(0.056)	(0.055)	(0.057)	(0.060)	(0.055)
CR5	0.069*	0.080**	0.072**	0.414**	0.309*	0.069*
	(0.035)	(0.033)	(0.033)	(0.172)	(0.168)	(0.035)
ROA	1.255	2.997***	1.776	−0.162	1.858	1.255
	(1.169)	(1.133)	(1.193)	(1.492)	(1.561)	(1.169)
NPL	−0.401***	—	−0.319**	−0.798***	—	−0.401***
	(0.122)	—	(0.123)	(0.236)	—	(0.122)
GDP	11.707**	7.114	9.571*	8.780	6.495	9.647*
	(5.617)	(5.872)	(5.577)	(5.633)	(6.145)	(5.616)
MOB	−3.500	−0.874	−3.443	−14.916	9.060	0.051
	(5.076)	(4.638)	(4.575)	(12.436)	(10.610)	(11.019)
Server	0.057	0.041	0.032	0.131*	0.058	0.054
	(0.057)	(0.059)	(0.056)	(0.067)	(0.059)	(0.061)

Variable name	FinTechC	FinTechC	FinTechC	FinTechC	FinTechC	FinTechC
	1	2	3	4	5	6
	OLS	OLS	OLS	FE	FE	FE
Card	0.323	—	—	0.305	—	—
	(1.823)	—	—	(1.842)	—	—
FinTech	0.663	—	—	0.654	—	—
	(0.872)	—	—	(0.880)	—	—
AI	0.849	1.419**	1.201**	0.857	1.350**	2.986*
	(0.846)	(0.551)	(0.536)	(0.855)	(0.633)	(0.139)
ATM	—	−0.003	0.002	—	−0.003	−0.030
	—	(0.007)	(0.007)	—	(0.008)	(0.045)
INTER	—	0.151**	—	—	0.208*	—
	—	(0.063)	—	—	(0.106)	—
KTFX	—	4.727**	0.805	—	4.165*	0.100
	—	(2.194)	(2.487)	—	(2.182)	(3.897)
Obser.	101	103	104	101	103	104
ID	0.588	0.535	0.573	0.619	0.453	0.446
R-squared	—	—	—	21	21	21

*** p < 0.01, ** p < 0.05, * p < 0.1. Standard errors in parentheses.

Source: Own calculation.

Table 3

Empirical Results for equation 1

Variable name	FinTechC	FinTechC	FinTechC	FinTechC	FinTechC	FinTechC
	1	2	3	4	5	6
	OLS	OLS	OLS	FE	FE	FE
L_H	−0.264**	−0.194	−0.359**	−0.286**	−0.212	−0.264**
	(0.127)	(0.158)	(0.147)	(0.123)	(0.158)	(0.127)
L_NFC	0.106	0.049	0.057	0.115*	0.055	0.106
	(0.071)	(0.074)	(0.067)	(0.069)	(0.074)	(0.071)
CR5	0.074**	0.079**	0.073**	0.078*	0.079**	0.074**
	(0.034)	(0.034)	(0.032)	(0.041)	(0.036)	(0.034)
ROA	1.187	3.122***	2.043*	0.960	3.078**	1.187
	(1.150)	(1.180)	(1.179)	(1.196)	(1.206)	(1.150)

Variable name	FinTechC 1 OLS	FinTechC 2 OLS	FinTechC 3 OLS	FinTechC 4 FE	FinTechC 5 FE	FinTechC 6 FE
NPL	−0.389***	—	−0.304**	−0.426***	—	−0.389***
	(0.119)	—	(0.120)	(0.133)	—	(0.119)
GDP	8.694	5.937	7.648	8.814	6.369	7.901
	(5.661)	(6.200)	(5.784)	(5.606)	(5.932)	(5.746)
MOB	−3.336	−0.401	−2.602	−3.394	0.453	−2.472
	(4.918)	(4.652)	(4.428)	(5.061)	(5.367)	(4.522)
Server	0.886**	—	1.037***	0.944**	—	1.042***
	(0.352)	—	(0.312)	(0.367)	—	(0.314)
Card	−0.117	—	—	1.179	—	—
	(1.766)	—	—	(2.041)	—	—
FinTech	0.820	—	—	2.042**	—	—
	(0.724)	—	—	(0.798)	—	—
AI	0.868	1.371**	1.017*	−0.504	1.256*	1.003*
	(0.806)	(0.545)	(0.518)	(0.843)	(0.667)	(0.532)
ATM	—	−0.002	0.004	—	−0.003	0.004
	—	(0.007)	(0.007)	—	(0.009)	(0.007)
INTER	—	0.164**	—	—	0.184*	—
	—	(0.081)	—	—	(0.095)	—
KTFX	—	3.586**	1.765	—	3.529**	1.535
	—	(1.544)	(1.522)	—	(1.529)	(1.502)
Obser.	101	103	104	101	103	104
ID	—	—	—	21	21	21
R-squared	0.560	0.565	0.561	0.633	0.610	0.668

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parentheses.

Source: Own calculation.

Moreover, we performed the robustness check based on equations 1 and 2 (see Table 4). In order to conduct the robustness tests first, we used a different approach to measure concentrations, second, we used a different approach to measuring digital technology and bank profitability. Finally, we estimated the baseline econometric model to be robust with using the *HHI* and *ROE* instead of *CR5* and *ROA*. Additionally, in the model we used *ATM1* as the DigiTech. Other dependent variables were defined in the same manner as in the baseline model. Table 4 presents the results of the panel regressions using equations 1 and 2 for the six estimates using the OLS estimator and panel data regression (FE).

Table 4

Empirical Results for equations 1 and 2

	FinTechC	FinTechC	FinTechC	FinTechC	FinTechC	FinTechC
Variable name	**1**	**2**	**3**	**4**	**5**	**6**
	OLS	**FE**	**FE**	**OLS**	**FE**	**FE**
L_H	—	—	—	−0.219	−0.537***	−0.523***
	—	—	—	(0.148)	(0.155)	(0.154)
L_NFC	—	—	—	0.161	0.086	0.096
	—	—	—	(0.101)	(0.075)	(0.074)
T_Loans	0.044	0.032	0.029	—	—	—
	(0.058)	(0.056)	(0.061)	—	—	—
HHI	23.583**	23.680	29.500	24.331**	28.540	29.640
	(10.228)	(25.805)	(38.460)	(11.391)	(23.822)	(23.722)
ROE	0.200**	0.076	−0.044	0.171	0.090	0.087
	(0.097)	(0.111)	(0.115)	(0.113)	(0.108)	(0.107)
NPL	−0.382***	−0.962***	−1.022***	−0.379***	−1.118***	−1.021***
	(0.135)	(0.354)	(0.292)	(0.140)	(0.329)	(0.322)
GDP	5.765	8.983	0.063	7.760	1.109	1.217
	(6.019)	(5.889)	(6.107)	(6.200)	(5.990)	(5.836)
MOB	−5.537	—	3.985	−4.329	—	8.344
	(5.165)	—	(9.555)	(5.132)	—	(8.911)
Server	0.852	—	0.073	1.671***	—	1.640***
	(0.562)	—	(0.617)	(0.492)	—	(0.447)
Card	−0.117	—	—	1.179	—	—
	(1.766)	—	—	(2.041)	—	—
FinTech	0.952	—	—	1.062*	—	—
	(0.658)	—	—	(0.635)	—	—
AI	0.796	1.371**	—	17.314*	16.673*	—
	(0.752)	(0.545)	—	(9.8675)	(9.8350)	—
ATM1	−0.597	—	—	−0.331	−0.597	—
	(0.440)	—	—	(0.436)	(0.440)	—
INTER	0.176*	0.869***	—	0.621**	0.665***	0.176*
	(0.103)	(0.242)	—	(0.260)	(0.232)	(0.103)
KTFX	—	4.459	—	—	3.856	4.086
	—	(4.738)	(3.210)	—	(4.322)	(4.046)
Obser.	101	96	96	96	91	91
ID	—	21	21	—	21	21
R−squared	0.441	0.582	0.547	0.507	0.676	0.647

Source: Own calculation. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parentheses.

The robustness check results generally confirmed the results of the baseline specification and the conclusions drawn from Tables 2–3. In Table 4, the positive and insignificant coefficient α_2 was found for total loans (columns 1, 2, 3). Furthermore, Table 4 shows the negative and significant coefficient α_{21} for loans for household (i.e., columns 5, 6) and the positive and insignificant coefficient α_{22} was found for loans for corporates (columns 4, 5, 6).

4.3. Summary of the Model Results

The model estimation results showed that in the case of model 1, it is not possible to clearly determine whether FinTech credit is a substitute or a complement to total credit. Estimating the model using equation 1 did not allow for an unambiguous verification of hypothesis 2. Therefore, six additional estimations were conducted for two different types of loans: loans for households and for corporates based on equation 2. The estimation results showed that FinTech credit seems to be a substitute for household loans. Furthermore, the robustness check results generally confirmed the results of the baseline specification. Interestingly, concentration (CR5) and bank profitability (ROA) proved to be significant for FinTech credit. On the one hand, the positive CR5 coefficient suggests that the higher the concentration in the banking sector and the lower the competition, the more FinTech credit tends to increase. This result may indicate that lower competition in the banking sector increases the attractiveness of alternative financing sources, including FinTech credit. AI support appears to foster the growth of FinTech credit. Furthermore, credit risk in the banking sector had a negative and significant impact on FinTech credit. Moreover, the analysis of the relevant literature and available studies indicated a significant impact of digital technologies on traditional banks and the entire financial sector. These changes are further driven using artificial intelligence. The above results allow us to conclude that digitalization has an impact on financial risk and traditional banks' performance.

Finally, the paper confirms the significant role of AI and FinTech companies in shaping traditional banks performance and credit market conditions, which impact the relationship between the financial sector and the real economy in European countries. However, the above results do not provide a clear answer to the research questions. These findings should be interpreted with caution due to significant data gaps. Therefore, further and more detailed research should be conducted based on a new data set.

5. Concluding Remarks

The paper analyses the impact of AI and FinTech on macro-financial linkages. The rapid development of artificial intelligence and digitalization in financial sector is taking place thanks to modern IT tools for storing huge amounts of data in the form of computing cloud and the possibility to process them, thanks to the increased power of computer and graphics processors. The above changes affect the financing of the real sector as well as the relationship between the financial sector and the real sphere of the economy. Furthermore, in today's world, technological progress is accelerating, which means that the concept of artificial intelligence is constantly evolving and changing.

The paper finds that digitalization affects bank performance and financial risk in European countries. Additionally, using a panel data regression model it shows that in European countries, especially those within the EU, FinTech credit tends to substitute household credit rather than complement bank credit, while total credit seems to be complementary. These results differ slightly from those of Cornelli, Frost, Gambacorta, Rau, Wardrop, and Ziegler (2023), who, based on a global database of FinTech and BigTech lending, found that FinTech and BigTech credit tend to complement rather than substitute other forms of credit. However, it should be noted that FinTech and BigTech companies are developing mainly in Asia. In European countries, traditional banks still dominate the financial sector; nevertheless, they continue to invest in new technologies and adopt additional distribution channels.

Although many reports have been prepared by financial institutions, there is still a lack of empirical research on the impact of new technologies on the bank loan market in European banking sector. The novelty of this paper lies in its analysis of these phenomena in Europe, mainly in the EU countries, which contributes to the literature on the subject. The practical implications of this paper offer valuable insights into macroprudential policy in the EU. However, the limitation of the study is the availability of data on FinTech credit, which ended in 2019. Further research should be conducted on an expanded panel of data concerning FinTech credit and the use of AI in banks.

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ARTIFICIAL INTELLIGENCE AND DEFICIT OF PERSONNEL IN THE ROMANIAN POLICE

ABSTRACT

The purpose of the article. Staff shortages in Romania's Police and Border Police have reached critical levels, with vacancy rates of 15% to over 28% in several counties. These shortfalls impose direct financial burdens through overtime, standby pay, and productivity losses while also degrading service quality. This article assesses whether — and to what extent artificial intelligence can offset these gaps and reduce the related fiscal strain. Drawing on international case studies, Romanian staffing data, and recent literature on public-sector digitalization, the study argues that targeted AI deployment can shift the emphasis from a quantitative staffing model to a qualitative efficiency model. The central hypothesis is that automating administrative and surveillance tasks with AI could substitute for roughly 15–25% of current personnel vacancies in Romanian law enforcement without proportional budget increases. The article also addresses principal risks algorithmic bias, privacy concerns, and governance gaps and proposes a phased implementation framework consistent with the EU regulatory requirements.

Methodology: The study uses comparative cases, Romanian staffing data, and EU – national policy analysis to assess AI's governance and fiscal implications in policing, acknowledging its conceptual, document-based design and lack of primary data.

Results of the research: Romania's severe police vacancies create safety and fiscal pressures, with understaffing driving overtime, reduced service quality, and declining trust. Targeted AI could offset part of the gap cost-effectively, but cannot replace human roles and requires strong governance. A phased national strategy and further empirical research remain essential for future implementation.

Keywords: Romanian Police, artificial intelligence, public management, personnel deficit, financial efficiency, predictive policing

JEL Class: H11, H76, O15, O33

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Introduction

Artificial intelligence systems are now embedded in everyday life from facial recognition that unlocks phones and their spread brings both opportunities and challenges for law enforcement. Romanian police institutions confront a convergence of pressures: deepening personnel shortages, rising operational costs, and growing public demand for faster, more effective services. Traditional responses, chiefly hiring more officers, are limited by austerity-driven budget freezes and a shrinking pool of qualified candidates caused by demographic aging and labour emigration; under these conditions, AI deserves a systematic, structural evaluation.

The article is organized as follows. Section 1 sets out the research problem, questions, hypothesis, and methodology. Section 2 examines the personnel crisis in the Romanian Police and Border Police using available quantitative data. Section 3 reviews international literature and case studies to evaluate AI's potential as a compensatory tool. Section 4 assesses the financial implications of adopting AI, including a detailed cost-benefit framework, implementation-cost components, pay-back analysis, and hidden long-term costs. Section 5 surveys the current state of AI deployment in Romanian law enforcement. Section 6 addresses governance, ethical, and legal considerations. Section 7 offers conclusions and policy recommendations.

1. Research Design: Questions, Hypothesis, and Methodology

1.1. Research Questions

This study is guided by three principal research questions:

Q1: What is the quantitative extent of the personnel deficit in the Romanian Police and Border Police, and what are its demonstrable consequences for public safety and institutional financial performance?

Q2: Can AI-enabled tools measurably compensate for these personnel shortfalls, and if so, through which specific applications and at what estimated cost?

Q3: What governance framework conditions are necessary for AI adoption in Romanian law enforcement to be legally compliant, financially sustainable, and ethically sound?

1.2. Research Hypothesis

The main hypothesis is that targeted AI applications in administrative automation, predictive analytics, and remote call-handling can effectively substitute for roughly 15–25% of current personnel vacancies in the Romanian Police without commensurate increases in budgetary outlays, provided a suitable regulatory and governance framework is in place. This claim draws on international evidence that AI can yield productivity gains in policing equivalent to about 0.25–0.5 FTE (full-time equivalent) per officer per year (Griffith, 2017; Cory & Birzer, 2024) and on the scale of Romanian vacancies documented in Section 3.

1.3. Methodology

The study adopts a multi-method design combining three complementary techniques: a comparative case-study analysis of AI implementations in police forces in the United States, the United Kingdom, and Germany selected for documentary accessibility and institutional comparability with Romania's EU context; secondary data analysis of publicly available Romanian Police staffing sources (Ministry of Internal Affairs reports; union communications; parliamentary committee minutes) to quantify vacancies and estimate financial costs; and document review and policy analysis of EU instruments (GDPR, the EU AI Act), Romanian legislation, and peer-reviewed literature on public management and organizational theory to inform governance and fiscal assessment. The study is explicitly conceptual-analytical rather than experimental: no primary survey data was collected, a limitation noted in the conclusions alongside recommendations for future empirical research.

2. Personnel Deficit in the Romanian Police and Border Police

2.1. Quantitative Evidence of Shortfalls

Critical staffing shortfalls in Romanian law enforcement have been documented by police unions, parliamentary oversight bodies, and investigative journalists. Compiled figures from union reports and statements by the Ministry of Internal Affairs (MAI) show that vacancy rates differ markedly across regions but consistently surpass the national averages observed in comparable EU member states (Staff Shortages, 2025).

Table 1

Selected Vacancy Rates in Romanian Law Enforcement Units (2024–2025)

County / Unit	Authorized Posts	Filled Posts	Vacancies	Vacancy Rate (%)
Teleorman County Police	~350	~250	~100	28.6%
Constanța Border Police	~600	~460	~140	~23%
Satu Mare Border Police	~200	~155	~45	~22%
Bucharest Metropolitan Police	~4,500	~3,700	~800	~18%
National average (Romanian Police)	—	—	—	~15–28%

Source: Own study based on MAI communications (www.mai.gov.ro/bilanturi-contabile), union reports (Staff Shortages, 2025), and parliamentary committee data.

These figures indicate that some units operate at little more than 70% of their authorized strength. For comparative reference, Eurostat data suggests that the EU average police officer-to-population ratio is approximately 3.3 officers per 1,000 inhabitants; Romania's effective ratio, after discounting vacancies, falls below this benchmark in several regions.

2.2. Root Causes of the Deficit

The staffing crisis is a result of multiple causes tied to public finance choices, human-resource policies, and broader demographic shifts. Christensen et al. (2020) distinguish structural causes those embedded in institutional design from contextual causes that arise from external pressures; both types are clearly present in Romania.

The primary structural driver is budgetary constraint and frozen vacancies. Austerity measures have institutionalized vacancy freezes as a cost-control tool, a pattern documented across transition-economy administrations. Ordinance OUG 26/2024 adjusted salaries but attached exclusionary performance criteria that rendered many serving officers ineligible, thus discouraging recruitment.

Contextual pressures amplify these structural problems: demographic ageing shrinks the pool of physically eligible recruits, while sustained emigration of working-age Romanians to Western EU states tightens the labour market for uniformed services. Together these dynamics create a structural trap in which vacancies accumulate faster than they can be filled.

2.3. Public Safety and Financial Costs

The consequences of understaffing extend beyond operational service quality and carry identifiable financial implications:

Slower response times: when insufficient field officers are available, dispatch times increase. Research in emergency services consistently links response time delays to higher incident severity and associated downstream costs (Moore & Poethig, 1999).

Overtime and standby costs: to compensate for vacant posts, Romanian Police units rely on mandatory, and frequently uncompensated, standby duty. Where overtime is paid, it represents an above-normal unit cost of labour typically 125–150% of the standard hourly rate applied to tasks.

Weakened border security: understaffing at border crossings in Constanța and Satu Mare creates capacity gaps that cross-border criminal networks may exploit, generating downstream enforcement and judicial costs.

Eroded community trust: research in public administration identifies trust as a public good with long-run fiscal implications: low-trust environments generate higher compliance costs and greater demands on enforcement resources (Bouckaert & Van de Walle, 2003).

Officer welfare costs: excessive workload, stress, and fatigue increase sick leave rates and early retirement, accelerating the very vacancy problem the overwork is intended to patch.

3. Artificial Intelligence as a compensatory mechanism in policing

3.1. Overview of AI Applications in Law Enforcement

The international literature on AI in policing has grown since 2015, spanning into criminology, public administration, and information systems. Perry et al. (2013), in a landmark RAND Corporation report, provided early systematic evidence that predictive policing tools can reduce crime rates in targeted areas by 5–10% relative to control zones. Subsequent work has broadened the scope to include administrative automation, video analysis, and natural language processing for report generation.

From an organizational theory perspective, the adoption of AI in public agencies follows patterns consistent with Dunleavy et al. (2006) ‘digital-era governance’ framework: rather than replacing bureaucratic structures wholesale, AI tends to be grafted onto existing workflows, producing productivity gains concentrated in routine, high-volume tasks. For Romanian Police, such tasks report writing, license plate recognition, call-centre handling represents the most tractable near-term targets.

3.2. Administrative automation: Report generation

Documentation, including incident reports, witness interviews, evidence logs, and court filings, takes up between 40 and 50 percent of a police officer's working time (Griffith, 2017). Much of this procedure may be automated by using large language models (LLMs) in conjunction with bodycam-integrated computer vision and speech-to-text transcription. The commercial maturity of this technology is demonstrated by Axon’s acquisition of Dextro and subsequent development of AI-assisted report tools; the business projects 40–50% savings in report authoring time.

A conservative 30% reduction in documentation time would be the functional equivalent of about 5,500–7,000 officer-hours per day for a Romanian police force that is estimated to employ about 37,000 officers nationwide. This amount is comparable to the output of several hundred additional FTEs (full-time equivalent).

3.3. Predictive policing and hotspot analytics

Predictive police systems create likelihood maps of crime occurrence based on geographic data, temporal trends, and previous crime data. Although there is an ongoing scholarly discussion on their efficacy and potential for bias (Ferguson, 2017; Brayne, 2021), well-executed systems have shown statistically significant decreases in crime in deployment scenarios with limited resources. Examples of experiments that demonstrate the effectiveness of training systems on representative data and auditing them for bias are the London Metropolitan Police study and the Santa Cruz (California) trial (Ratcliffe, 2016).

Predictive policing's financial reasoning is simple: it increases the efficient use of an understaffed force by focusing scarce patrol efforts on high-probability areas. Instead of using saturation, less police may strategically cover more land.

3.4. Tele-Policing and Virtual Call Centres

A relevant international model for Romania is the Wichita Police Department's Commissioned Call Centre (CCC), evaluated by Cory and Birzer (2024). Light-duty officers staffing a centralized telephone response unit handled low-risk, low-harm calls with response initiation times of 7.2 minutes, compared to 45 minutes for traditional dispatch. Caller satisfaction remained high, including for sensitive cases such as domestic violence reporting where privacy was valued.

A Romanian unit staffed partly by officers with reduced physical capacity or near retirement would fill staffing gaps in high-vacancy areas while giving experienced officers a respectful, continued role instead of forcing early retirement.

3.5. Surveillance Infrastructure: LPR and Facial Recognition

More than 3,000 police departments worldwide employ licence plate recognition (LPR) technology that automatically identifies vehicles, cross-referencing plates against stolen vehicle registers, wanted person databases, and open warrants. Romania's existing CCTV infrastructure in major cities provides a foundation for LPR overlays without requiring large-scale capital expenditure. Flock Safety (2023) provides documented evidence of significant case breakthroughs catalytic converter theft rings, human trafficking networks enabled by LPR systems operating largely autonomously.

Facial recognition occupies more contested legal and ethical territory, particularly under GDPR and the EU AI Act. The current EU regulatory framework classifies 'real-time remote biometric identification' as high-risk AI, subject to strict conditions. Any Romanian deployment must comply with these constraints, limiting facial recognition to carefully investigative use cases rather than public space surveillance.

4. Financial Implications of AI Adoption

4.1. Cost-Benefit Framework

From a public financial management perspective, evaluating AI investment in policing requires a framework that captures both direct cost savings and indirect productivity gains. Hood & Dixon (2015) propose a 'public value accounting' model that goes beyond narrow expenditure metrics to include service quality, citizen welfare, and institutional resilience all of which deteriorate under chronic understaffing.

Table 2 below provides a structured estimation of efficiency gains associated with the principal AI applications discussed in Section 4, drawing on documented international deployments.

Table 2

Estimated Financial and Efficiency Impacts of Selected AI Applications in Policing

AI Application	Estimated Efficiency Gain	Financial Impact	Reference Case
Automated report generation (LLM/speech-to-text)	~40–50% reduction in report writing time	Equivalent to ~0.5 FTE per officer annually	Axon / Veritone deployments, USA (Griffith, 2017)
Predictive policing (hotspot analytics)	~5–10% crime reduction in targeted zones	Reduced incident costs; lower overtime expenditure	Perry et al. (2013); RAND Corporation
Tele-Cop / virtual call centre	Response time ↓ from 45 to 7.2 min for low-risk calls	Frees field officers; lowers operational cost per call	Wichita Police Dept. CCC (Cory & Birzer, 2024)
LPR / facial-recognition surveillance	3,000+ agencies worldwide; rapid suspect identification	Reduced investigation costs; faster case closure	Flock Safety (2023); Clearview AI (Ukraine MoD)
Video redaction automation	70–80% reduction in manual video review time	Significant labour cost savings for evidence processing	Axon / Veritone (Griffith, 2017)

Source: Own study based on Perry et al. 2013; Griffith, 2017; Flock Safety, 2023; Cory & Birzer, 2024.

4.2. Implementation-Cost Components

A realistic cost assessment must distinguish between one-off capital outlays and ongoing operating expenses. The following sub-components are relevant for the Romanian context:

Table 3

Cost assessment and typical price ranges

Cost Component	Typical Price Ranges
Capital investment – hardware, software licences, integration	• LPR camera: $200–$742 (entry-level), $750–$1,500 (mid-range), up to $20,000 (enterprise). • AI-report-generation system (e.g., Draft One): $1.3 m for 500 deputies. • National AI hub (Police.AI, UK): £115 m (≈ €131 m) for a pan-UK programme.
Annual operating cost – licensing, maintenance, cloud compute	• LPR subscription: $2,500–$3,000 per camera per year (20% of hardware cost). • AI-report-generation licence: $200–$300 per officer per year (est.). • AI call-centre per-minute cost: $0.05–$0.25 (average $0.10).
Training & change-management	200 hours of officer-training at €200 per hour ≈ €40 k per 200 officers (est.).
Governance & compliance	AI-Act conformity assessment: 10% of total implementation cost (est.) – €13 m for a national programme.
Hidden & long-term costs	Data-privacy audits, bias-testing, system obsolescence, public-trust mitigation.

Source: Own study based on Dunleavy et al., 2006; Angwin et al., 2016; Murphy, 2023; Penescu, 2025.

4.3. Pay-back Analysis and ROI

A simple ROI calculation for a medium-size county (≈ 1,000 officers) illustrates the fiscal viability of AI deployment.

Table 4

Pay back Analysis and ROI

Application	Initial Capital	Annual Operating	Estimated Annual Savings	Pay-back Period
AI-report generation	€3.2 m (≈ $3.6 m)	€200 k	€4.0 m (0.5 FTE per officer, €4 k salary per FTE)	0.8 y
Predictive policing	€1.0 m	€200 k	€1.2 m (crime-reduction cost)	0.8 y
Tele-Cop call centre	€1.5 m	€60 k	€1.8 m (overtime-cost avoidance)	0.8 y
LPR surveillance	€200 k	€125 k	€400 k (faster investigations)	0.8 y
AI call-centre	€1.0 m	€60 k	€2.4 m (staff-cost savings)	0.6 y

Source: Own study. In each case the pay back period is well below one fiscal year, assuming the estimated savings materialise.

4.4. Hidden and Long-Term Costs

GDPR and the EU AI Act require data minimisation, transparency, and auditability for AI systems, failing to comply can incur fines up to €10 million per year.

Routine bias audits (using methods like LIME and counterfactual-fairness tests) are necessary to detect and mitigate algorithmic bias and typically consume 5–10% of the annual operating budget.

AI models need regular retraining and upgrades to remain accurate and secure; plan for an annual upgrade cost of about 3–5% of the initial capital investment.

Community outreach and education programmes to mitigate public distrust from surveillance deployments cost roughly €50k per year and are essential to reduce backlash, explain system purpose and limits, and maintain legitimacy.

While upfront capital requirements for a national AI strategy are substantial, the cumulative savings from reduced overtime, improved productivity, and lower investigation costs yield a strong net present value. The ROI is robust across a range of realistic cost scenarios, reinforcing the financial case for a phased, governance-anchored AI deployment in Romanian policing.

5. Current Status of AI Deployment in Romanian Law Enforcement

The integration of AI within Romanian law enforcement is at an early stage relative to Western European peer institutions, though several initiatives indicate growing institutional appetite for technological solutions.

An AI-assisted online fraud prevention campaign has been implemented by the Bucharest Metropolitan Police, which uses generative AI technologies to create instructional content alerting the public about account takeover schemes, phishing, and fraudulent communications. One of the risks mentioned was the ‘Vote for Adeline’ WhatsApp breach technique, where victims were tricked into giving third-party account access (Ion, 2025). Beyond its immediate role in public education, this effort is significant because it shows institutional acceptance of AI as a valid operational tool, setting administrative and cultural standards for broader deployment.

At the strategic level, Romania’s Ministry of Internal Affairs (MAI) has announced plans to incorporate drones, robotics, and AI into emergency response, border security, and public safety operations (Penescu, 2025). A digital centre for civil services is under development. Notably, the MAI has opened exploratory dialogue with Qatar on AI applications and digital governance, seeking to leverage expertise demonstrated during the FIFA World Cup 2022, an event that showcased sophisticated crowd management and real-time security analytics at scale (Penescu, 2025).

These developments are encouraging but remain at the planning or pilot stage. Romania does not yet have a systematic AI deployment strategy for policing comparable to those of France, the Netherlands, or the United Kingdom. The evolution of the EU AI Act which entered into force in August 2024 and imposes phased obligations on high-risk AI systems creates both a compliance imperative and an institutional catalyst for formalizing Romania's approach.

6. Governance, Ethics, and Legal Constraints

6.1. The EU Regulatory Framework

Two principal EU regulatory instruments govern AI deployment in Romanian law enforcement. The General Data Protection Regulation (GDPR, Regulation 2016/679) establishes data minimization, purpose limitation, and accountability principles that apply to all processing of personal data, including surveillance footage and biometric identifiers. Member state law enforcement authorities are subject to Directive 2016/680 (the Law Enforcement Directive), a lex specialist that permits processing for law enforcement purposes subject to necessity and proportionality requirements.

The EU AI Act (Regulation 2024/1689), while not yet fully applicable, classifies several law enforcement AI applications including real-time remote biometric identification and AI used to predict criminal behaviour as 'high-risk', subject to mandatory conformity assessment, transparency obligations, and human oversight requirements. This framework aligns with the principles of interpretability and auditability recommended in the academic literature (Doshi-Velez & Kim, 2017).

6.2. Bias, Fairness, and Accountability

The risk of algorithmic bias in AI law enforcement has been extensively documented. Angwin et al. (2016) investigation of the COMPAS recidivism tool demonstrated systematic racial disparities in risk score generation a finding that has become a touchstone in the normative literature on AI fairness. For Romania, where police interactions with minority communities notably Roma citizens have attracted criticism from the Council of Europe and domestic civil society organizations, the risk of bias amplification through AI is particularly salient.

Mitigation requires training data audits, counterfactual fairness testing, and regular post-deployment bias monitoring. The LIME (Local Interpretable Model-Agnostic Explanations) framework provides one technically accessible approach to achieving interpretability for complex models (Ribeiro et al., 2016). Institutional accountability requires that human decision-makers retain meaningful authority over AI-assisted outputs, particularly for decisions affecting individual liberty.

6.3. Governance Recommendations

Drawing on the governance literature (Bannister & Connolly, 2014; Meijer & Bolívar, 2016) and the OECD's Principles on AI (2019), this article recommends a five-element governance framework for AI adoption in Romanian policing:

Clear purpose definition: each AI application must have a specific, documented operational objective against which performance is measured.

Human oversight protocols: no AI output should trigger enforcement action without review by a qualified human officer, particularly for decisions involving arrest, surveillance targeting, or risk classification.

Bias auditing: all AI systems should undergo pre-deployment bias assessment and annual post-deployment audit, with results published in MAI annual reports.

Citizens should be informed of AI systems in use, their purposes, and the data they process, consistent with GDPR accountability obligations.

A standing parliamentary sub-committee on law enforcement technology, with civil society representation, should exercise ex ante and ex post scrutiny of major AI deployments.

Conclusions and policy recommendations

This article has argued that Romania's worsening police personnel deficit documented at vacancy rates of 15–28% across key units constitutes, both a public safety crisis and a financial management problem. The cost of chronic understaffing is borne through overtime expenditure, service quality deterioration, officer welfare decline, and ultimately eroded public trust each carrying financial implications that conventional budget analysis tends to understate.

International research supports the central hypothesis concept that focused AI deployment can effectively offset 15–25% of existing vacancies for AI-addressable jobs. In similar institutional situations, automated report production, virtual call handling, predictive hotspot analytics, and license plate recognition have all been shown to increase productivity. When compared to the ongoing costs of vacancy-driven overtime and service deterioration over a five-year period, the financial argument for AI investment is favorable.

However, there are three crucial qualifiers that must be added to this conclusion. First, since deterrence, fostering community trust, and having the legal right to use force are all in-herently human responsibilities, AI can supplement sworn cops but cannot take their place. Second, using AI without sufficient monitoring and bias controls runs the danger of exacerbating already-existing inequities and creating legal issues that undermine institutional legitimacy. For this reason, the governance architecture outlined in Section 6 is a must, not an afterthought. Third, Romania's AI deployment is still in its early stages, and future empirical study should look at the infrastructure, training, and organizational change management aspects that will be necessary to achieve the predicted efficiency improvements.

The policy recommendations from this analysis are as follows: Romania's Ministry of Internal Affairs should develop a phased national AI strategy for law enforcement, prioritizing administrative automation and predictive analytics in the first phase, establishing the governance infrastructure described above in parallel, and deferring higher-risk biometric identification applications until the EU AI Act's phased obligations are fully operative and domestic oversight capacity is demonstrably sufficient.

The international experience reviewed here, and the quantitative evidence on Romanian vacancies, together justify treating AI not as a distant aspiration but as an urgent, financially sound, and legally feasible element of police reform.

Study limitations and future research

This study is subject to several limitations that future research should address. First, official estimates may vary since the personnel data used is derived from parliamentary comments and union communications rather than verified MAI administrative records. Second, the cost estimates in Table 2 may not accurately reflect the institutional and labor market situation in Romania because they are based on foreign deployments. Third, the study's capacity to evaluate adoption hurdles and community acceptability is limited since it does not include original survey data from Romanian officers or people. Future empirical studies should concentrate on three areas: (1) a cost-benefit analysis using official MAI budget data; (2) a comparative study of AI governance frameworks among police forces in Central and Eastern Europe; and (3) a systematic survey of Romanian officers regarding AI adoption readiness and perceived barriers.

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ECONOMIC AND FINANCIAL ASSESSMENT OF A FOOD TRADE ENTERPRISE

ABSTRACT

The purpose of the article. The purpose of the study was to assess the financial situation of Dino Polska S.A. company. To achieve this goal, a research hypothesis was formulated: Dino Polska S.A.'s development strategy guarantees the dynamic growth of the chain and an improvement in its financial situation. The research problem focuses on a comprehensive analysis of the company's actual assets and financial situation and an assessment of changes over the analyzed period.

Methodology. The assessment was performed based on the preliminary economic analysis and ratio analysis, where liquidity, profitability, operational efficiency and debt were evaluated. Time scope of the analysis covered the period 2019-2023, and the data was retrieved from the annual financial statements.

Results of the research. Positive changes in the economic situation result in the good financial condition of Dino Polska S.A. It was shown that Dino Polska S.A. was growing each consecutive year and presented a good financial standing. The company has a clearly planned path of development for the future and systematically pursues its successive goals. Having applied both a safe and responsible financial policy, it secures smooth operations in conducting further business activities, even if unexpected events were to occur. The operational efficiency and debt ratios presented the most favorable values, however, the company needs to work on improving its quick ratio and cash ratio, as financial problems may arise in case of unexpected expenses. It is advisable to maintain timely sales revenues and appropriate inventory turnover within the company, as well as to accumulate cash reserves, which will increase financial security during market fluctuations. This study, which assesses the company's financial situation, identifies potential areas requiring attention. The results of the analysis may be useful to both current and potential investors, market analysts, and the company's management in its strategic decision-making process.

Keywords: economic analysis, financial indicators, food trade

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Introduction

The functioning of an enterprise is becoming increasingly complex. Such a situation is influenced by the rapidly developing market economy, the increasing level of competition, as well as the growing customer expectations regarding a product quality. Progressive globalization and ongoing changes in the economic environment prevent companies from predicting accurately and preparing for what is going to happen in a few or several years. Therefore, coping with all these challenges requires flexibility and making informed decisions, both regarding current and strategic issues. Financial analysis constitutes an important element helping to adapt best to the conditions imposed by the market economy. Its purpose is not only to calculate financial ratios, but most of all to assess the operational efficiency, the asset and financial position of an enterprise, as well as to explain the reasons for changes and opportunities to improve the financial standing.

In the presented study, the Dino Polska S.A. company, which belongs to a nationwide retail network and is a leading player in the continuously growing segment of medium-sized supermarkets, was chosen as a case study to evaluate its economic and financial situation. The selection criterion was the desire to assess changes in the analysis of the economic and financial situation of Dino Polska. The company was previously analyzed between 2017 and 2019 by Martyna Sankowska and Zofia Kołoszko-Chomentowska (2022). Their research became the basis for supplementing this study and understanding the company's financial results in subsequent years.

It is also significant that Dino stands out from Biedronka and Lidl in terms of its product offering, as it boasts a serviced butcher's counter in its stores and operates its own butcher shop. Dino offers approximately 5.000 products, 500 of which are the most price-sensitive, compared to competitors. However, the sales mix is crucial. Dino's expansion model is based on its own real estate. All stores have a standardized format, approximately 400 square meters, and are most often located in smaller and medium-sized towns or on the outskirts of cities. The company rarely leases, which means Dino can also be viewed as a "real estate tycoon" (Kijek 2025, p. 1). At the beginning of 2026, the Polish Dino retail chain comprised 3.033 stores and 3.000 locations, with a total sales area of 1.200.300 m², compared to 1.061.200 m² the previous year. This is one of the fastest growth rates in Polish retail (Wojtal 2026, p. 1).

In the times of growing consumerism, stores are adapting to the needs of customers, at the same time striving to maximize their efficiency, which remains the primary goal of any business. The role of supermarkets has changed significantly over the years. They have begun to expand their availability, focusing not only on locations in large cities, but also in small towns and even in rural areas.

Literature review

Retail trade in Poland is developing very dynamically, undergoing one of the greatest transformations, which is the result of technological progress and changing consumer expectations (Haberla & Waniowski, 2024, p. 20). Various commercial entities operate in the structure of food trade. Jerzy Dietl defines them as "forms of retail trade." Halina Szulce uses the term in a broader sense than Dietl, referring to both retail enterprises and retail sales outlets and their forms of concentration. J. Chwałek, on the other hand, uses the concept of "types of retail sales outlets" (Dietl, 1991, p. 31; Szulce, 1998, p. 78; Chwałek, 1993, p. 117; Drzazga 2016, pp. 114–115).

According to Szulce, in accordance with the first definition of retail forms, the largest role in this group is played by national integrated retail chains, which come in three organizational and legal forms: purchasing groups, retailer associations, and franchise networks (Kłosiewicz-Górecka 2007, p. 19). In integrated networks, typically created by retailers or with the participation of long-standing and proven suppliers, emphasis is placed on cooperation and the development of partnerships. Coordination and management of the network should be carried out in such a way as to achieve the greatest possible complementary and strategic effect (Otto & Olczak, 2007, p. 183).

Creating interorganizational relationships in the form of network structures has become a prerequisite for building the competitive advantage of modern enterprises (Jarillo, 1988, p. 32; Slupina, 2018, p. 460). Network structures are closely linked to cooperative arrangements. These links encompass all dependencies and relationships between companies and institutions. Cooperative arrangements are designed to meet operational goals, while the goals of network structures are strategic in nature (Gomes-Casseres, 1994, p. 62).

Applying the theory of network organizations to retailing, it can be assumed that a retail chain is a system for selling goods that belongs to a retail chain and has a common owner. A chain of stores is centrally managed. A retail chain typically has a central purchasing department and sells a similar product range across its stores. Centralization allows for the purchase of large quantities of goods at attractive prices (Reformat, 2011, p. 54).

The functioning of business entities in the modern economy requires systematic control along with the assessment of financial phenomena taking place both inside and outside an enterprise. A prerequisite for efficient and effective business operations in the market requires analyzing the achieved economic results using the financial analysis tools (Sankowska & Kołoszko-Chomentowska, 2022, p. 61). In practice, ratio analysis is most widely used to assess the financial condition of an enterprise. Financial indicators and their comparison over time allow determining both strengths and weaknesses of a business financial standing (Bednarski, 2007, pp. 64–70).

The role of financial analysis, as a tool for managing an enterprise and as an instrument to assess its standing, cannot be overestimated. Proper management of a company generating profit and creating value while maintaining an acceptable level of risk reflects a positive assessment of the company financial situation. Financial analysis supports decision-making within a company and contributes to the improvement of economic processes. Its goal is to identify the structure of phenomena and processes occurring in a company's operations, determine their interdependencies, and determine the magnitude and causes of deviations between actual and expected states (Bednarski et al., 2003, p. 11).

Vertical and horizontal analysis of the balance sheet and profit and loss account structure, as well as the ratio analysis, are commonly used to assess changes in the financial standing of an enterprise. Ratio analysis is an example of a research tool using the method of phenomena interdependence (Walczak, 2007, p. 14). According to Pomykalska and Pomykalski (2007) statistical analysis in the analysis of the financial situation of the company complements the preliminary version of financial documents and detailed information on the relationships between control components (p. 66). The groups of indicators used to assess the financial standing of a business have become quite common. The indicators of liquidity, operational efficiency, profitability and debt are included among those most widely used.The results of ratio analysis allow determining the rate and structure of changes, however, they do not provide for an assessment of the causes underlying such a situation. Ratio analysis is a useful tool, but only if the analyst is aware of its limitations, and the calculated indicator is useful when compared against a certain benchmark (Dudycz & Skoczylas, 2014, pp. 55–80; 2015, pp. 71–96; 2016, pp. 70–96; 2017, pp. 74–100; 2018, pp. 62–88; 2019, pp. 57–84; 2020, pp. 67–94; 2021a, pp. 73–100; 2021b, pp. 68–95; 2023, pp. 61–88). It is also emphasized that the results should be interpreted with due caution, which is particularly important when forecasting a given enterprise development trends (Panfil, 2011, p. 479).

Research methodology

The purpose of the article was to assess the economic and financial situation of a selected enterprise. In this case, it was decided to analyze the financial situation of Dino Polska S.A. It is a nationwide network of medium-sized supermarkets, which is characterized by one of the fastest growing chains in the food retail market in Poland in terms of the number of stores and sales value.

To achieve this goal, the article formulates a research hypothesis stating that Dino Polska S.A.'s development strategy guarantees the dynamic growth of its network and an improvement in its financial situation. The subject of the study is an economic and financial analysis of Dino Polska S.A. To verify the hypothesis, basic tools for analyzing data from the company's financial statements were used. The research problem focuses on a comprehensive analysis of the actual financial and asset status of the company and an assessment of changes in the analyzed period compared to previous periods.

The problem addressed in the study is providing an answer to the following question: what kind of changes occurred in the financial situation of the company during the analyzed period of time, and whether they were positive for the business.

The substantive scope of the study included a preliminary analysis of the economic situation based on determining the structure and dynamics of change in the balance sheet assets and liabilities and also in the profit and loss account (Bednarski, 2007, pp. 64–70). In addition, a ratio analysis was applied. (Wędzki, 2019, pp. 47–57). The spatial scope of the study covered business operations of Dino Polska S.A., whereas the temporal scope of the research referred to the period 2019–2023.

Source materials for the economic and financial analysis were collected using the critical method of document analysis, based on the data retrieved from the company financial statements (Szatur-Jaworska, 2010, pp. 108–110). Descriptive method and comparative analysis were applied to interpret the findings (Kopeć 1983, pp. 166–199; Stachak, 2006, pp. 213–216; Kawa, 2013, pp. 178–180; Michalak, 2016, p. 10). The ratio analysis method was used to assess the financial situation of the company, taking into account liquidity, operational efficiency, profitability and debt ratios (Ćwiąkała-Małys & Nowak, 2001, pp. 62–72; Kowalak, 2003, pp. 49–83; Sierpińska & Jachna, 2004, pp. 145–203; Nowak, 2005, pp. 165–231; Bednarski, 2007, pp. 76–118; Korol, 2013, p. 21; Kołosowska et al., 2018, pp. 71–130). The results are presented in the tables below.

Findings

The preliminary analysis of Dino Polska S.A. financial statements began with examining the structure and dynamics of the individual balance sheet and profit and loss account components. A balance sheet is a document presenting the financial and economic situation of a company at a specific point in the past or forecasting its condition for a specific period in the future (Jantoń-Drozdowska, 2017, pp. 102–132). It is a statement presenting the value of resources at the company's disposal and the sources of their origin (Szymańska, 2007, p. 62). A profit and loss account, in turn, allows the assessments of costs incurred by major items and the revenues earned from various sources, thus ultimately providing a good basis for making economic decisions (Nowak, 2015, pp. 145–153).

The subject of the study was to examine the structure of the most important components included in the financial statement and their dynamics of change during the analyzed period. For this purpose, the preliminary analysis tools were used, i.e., vertical analysis, which shows the share of a given item in the structure, and horizontal analysis, which presents the dynamics of change regarding a particular item in relation to its value in the previous year. The analysis carried out in this way allowed to assess which components of the report have the greatest impact on the company's financial position. To begin with, the structure of the company assets was examined, the results of which are shown in Table 1. The calculations confirmed that fixed assets had a predominant share in the company total assets, and in particular the tangible fixed assets, which accounted for approx. ¾ of total assets. Such a significant share results from the fact that, buildings, machinery, equipment, or vehicles are indispensable for this type of business. The second asset was inventory, which accounts for more than 14% of the structure, and the volume of which has been increasing in Dino Polska S.A. each consecutive year. Inventories went up by more than 10% over the period covered by the study, and at the end of 2023 they accounted for more than 25% of total assets. Their growth is influenced by high consumption recorded in the Polish market. Therefore, a larger inventory volume protects the company against a shortage of goods on store shelves. The share of cash dropped significantly over the period under study. Its balance sheet value amounted to only PLN 218,389 thousand at the end of 2023, which is caused by Poles shifting away from cash payments and switching to cashless transactions.

Dino Polska S.A. reported positive dynamics of change in almost every significant item on the assets side of the balance sheet during the analyzed period. Only the right-of-use assets recorded negative dynamics of change at the end of 2023, and their value decreased by more than 11%. The largest changes in dynamics were observed in the values of current assets which, despite their low share in total assets, reached the highest growth rates. It primarily referred to inventories and trade receivables, where the average annual growth was approx. 40% in the period 2019–2023.

Table 1

Structure and dynamics of change in assets in the period 2019–2023 [%]

Specification	Structure					Dynamics (previous year = 100)			
	2019	2020	2021	2022	2023	2020	2021	2022	2023
Fixed assets	**73.91**	**72.77**	**72.31**	**69.94**	**68.65**	**126.06**	**127.86**	**121.47**	**113.15**
Tangible fixed assets	65.43	67.31	68.51	67.42	66.24	131.71	130.99	123.59	113.26
Right-of-use assets	5.79	3.31	1.95	1.17	0.90	73.30	75.83	75.12	88.95
Intangible assets	2.28	1.78	1.35	1.05	1.11	100.00	97.88	97.72	121.45

Specification	Structure					Dynamics (previous year = 100)			
	2019	2020	2021	2022	2023	2020	2021	2022	2023
Current assets	**26.09**	**27.23**	**27.69**	**30.06**	**31.35**	**133.63**	**130.89**	**136.35**	**120.19**
Inventories	14.34	15.71	19.16	21.98	25.43	140.25	156.94	144.07	133.36
Trade receivables	1.80	1.56	2.01	3.05	3.18	111.14	165.87	190.87	120.23
Cash	9.07	8.62	5.84	4.25	2.10	121.71	87.14	91.42	57.06

Source: Own compilation based on the data presented in Dino Polska S.A. annual reports.

In the next stage, the structure and dynamics of change in the company liabilities were subjected to preliminary analysis, the detailed results of which are presented in Table 2. The analyzed period showed significant changes in the structure of the main components of liabilities, i.e., total equity and total liabilities. In 2019, their share was approx. 37% and almost 63%, respectively. In 2023, total equity accounted for as much as 54%, while total liabilities for approx. 46%. This is a positive change, as it means that Dino Polska S.A. is reducing its liabilities to external parties relative to its equity. Despite that, it is focused on developing its business intensively, which indicates a very good financial standing of the company. The share of long-term liabilities dropped considerably, by as much as 11% in the structure of liabilities. The calculations of the dynamics of change regarding liabilities for Dino Polska S.A. showed that, except for long-term liabilities, all items of liabilities presented positive dynamics of change. The highest rate of the dynamics of change appeared at the retained profit item, recording a 39% increase in 2023. It is a positive trend which allows the company to grow without the need for external financing. The significant growth in the amount of retained profit over the years supports increasing the financial stability of an enterprise, and also has a positive impact on its market value. A high rate of the dynamics of change was also recorded in the supplementary capital as, at the end of 2023, its value went up by 32% as compared to the previous year.

Table 2

Structure and dynamics of change in liabilities in the period 2019–2023 [%]

Specification	Structure					Dynamics (previous year = 100)			
	2019	2020	2021	2022	2023	2020	2021	2022	2023
Equity	**37.29**	**40.69**	**42.83**	**46.69**	**54.01**	**139.71**	**135.46**	**136.92**	**133.34**
Share capital	0.23	0.18	0.14	0.11	0.09	100.00	100.00	100.00	100.00
Supplementary capital	37.97	37.04	37.77	39.01	44.83	124.89	131.23	129.70	132.46
Retained profit	1.08	3.34	4.82	7.49	9.02	394.91	185.64	195.40	138.76

Specification	Structure					Dynamics (previous year = 100)			
	2019	2020	2021	2022	2023	2020	2021	2022	2023
Total liabilities	**62.71**	**59.31**	**57.17**	**53.31**	**45.99**	**121.09**	**124.04**	**117.10**	**99.44**
Long-term liabilities	19.77	21.96	15.24	12.32	8.61	142.20	89.34	101.50	80.52
Short-term liabilities	42.94	37.35	41.93	40.99	37.38	111.38	144.45	122.78	105.13

Source: Own compilation based on the data presented in Dino Polska S.A. annual reports.

The profit and loss account of Dino Polska S.A., in the period 2019–2023, was also analyzed, allowing to assess how the specific revenues and expenses affect the financial result of the company. Table 3 shows the structure and dynamics of change in the company revenues. Sales revenues had by far the largest share in total revenues, accounting for approx. 99.90% of total revenues during the period under review. Such a distribution is typical for trading companies, especially grocery stores, for which sales revenues are the main source of income (Martyniuk, 2010, p. 143; Maciejewska, 2018, p. 228).

Table 3

Structure and dynamics of change in revenues in the period 2019–2023 [%]

Specification	Structure					Dynamics (previous year = 100)			
	2019	2020	2021	2022	2023	2020	2021	2022	2023
Sales revenues	99.89	99.89	99.88	99.89	99.91	132.42	131.96	148.19	129.62
Operating revenues	0.10	0.07	0.11	0.08	0.05	100.89	189.05	113.35	82.77
Financial revenues	0.01	0.03	0.01	0.03	0.04	345.10	34.57	455.05	205.07

Source: Own compilation based on the data presented in Dino Polska S.A. annual reports.

Dino Polska S.A. reported a dynamic growth in sales revenues in the analyzed period, primarily in 2022. It was influenced by high inflation, which occurred during that period and disrupted the sustained value growth of approx. 30% per year. The highest level of dynamics was observed in financial revenues. In terms of the cost structure, the largest share went to costs of goods sold, which amounted to 80% of total costs in 2019–2023. Table 4 shows the detailed results of the structure and dynamics of change related to costs. High level of sales costs is inevitable when running an enterprise such as a grocery retail chain. During the period under study, sales and marketing costs remained at approx.16% of total costs. Companies experiencing high level of market competition cannot afford to reduce this form of costs for fear of losing customers and facing a reduction in their income.

In terms of costs, a positive dynamics of change was recorded in the period 2019–2023. The largest increase in costs was observed in 2022, especially in terms of financial costs, which went up by more than 202% compared to 2021.

Table 4

Structure and dynamics of change in costs in the period 2019–2023 [%]

Specification	Structure					Dynamics (previous year = 100)			
	2019	2020	2021	2022	2023	2020	2021	2022	2023
Costs of goods sold	79.86	79.24	79.85	80.46	81.29	130.02	133.45	149.81	131.27
Costs of sales and marketing	16.95	17.57	17.36	16.48	15.97	135.82	130.81	141.16	125.92
General and administrative costs	1.03	1.05	0.93	0.77	0.72	133.94	117.54	122.11	121.31
Operating costs	0.06	0.06	0.12	0.10	0.04	129.10	259.48	122.88	56.45
Financial costs	0.83	0.55	0.37	0.76	0.61	86.27	89.65	302.54	104.26

Source: Own compilation based on the data presented in Dino Polska S.A. annual reports.

In addition, Table 5 shows the share of total costs as well as cost of goods sold and net profit in relation to total revenues. The data indicates that the level of total costs was stable at 94–95%. It means that total costs accounted for a large share of total revenues, and the company was operating with a small margin. The share of cost of goods sold also showed an upward trend from 75.5% in 2019 up to 77% in 2023. This increase can indicate rising production or sales costs, which can affect the company profitability. Dino Polska S.A. did not incur business losses during the analyzed period, and ended each year with a net profit of approx. 5–6% compared to total revenues. The share of net profit in total revenues declined in the last year of the conducted analysis. This can indicate rising costs that are not fully reflected in revenues which, in turn, suggests that the company may be struggling to control costs or experience problems with rising sales prices.

Table 5

Level of net costs and profits in total revenues in the period 2019–2023 [%]

Specification	2019	2020	2021	2022	2023
Share of total costs	94.63	93.65	93.98	94.29	94.53
Share of costs of goods sold	75.57	74.21	75.04	75.86	76.84
Share of net profit	5.37	6.35	6.02	5.71	5.47

Source: Own compilation based on the data presented in Dino Polska S.A. annual reports.

Ratio analysis was the next step in assessing the economic and financial situation of Dino Polska S.A. The study focused on four groups of indicators: liquidity, debt, profitability and operational efficiency. They stand for the basic financial indicators which best assess the financial condition of an enterprise and allow to identify irregularities in their functioning. Table 6 presents the detailed values of liquidity indicators for Dino Polska S.A. in the period 2019–2023.

Table 6

Liquidity indicators in the period 2019–2023

Specification	2019	2020	2021	2022	2023
Current ratio	0.61	0.73	0.66	0.73	0.84
Quick ratio	0.26	0.29	0.18	0.17	0.13
Cash ratio	0.21	0.23	0.14	0.10	0.06

Source: Own compilation based on the data presented in Dino Polska S.A. annual reports.

Financial liquidity is a phenomenon that is subject to constant changes, showing high variability in terms of its magnitude (Babuśka, 2018, p. 101), and its possession results from maintaining harmony between expenses and income from various sources (Babuśka, 2018, p. 100). It is liquidity, not efficiency, that determines whether a company goes bankrupt (Czerwonka & Jaworski, 2024, p. 202; Talib et al., 2025, pp. 624–619). The level of financial liquidity is one of the key tasks of every company (Pawlik & Kuś, 2025, p. 162), because it determines its current functioning, influences its competitive position and determines the possibility of further existence on the market (Zhu et al., 2025, p. 48).

In 2019, the current ratio for Dino Polska S.A. was quite low at the level of 0.60. A low value indicates possible problems with timely payment of the incurred short-term liabilities. In theory, the liquidity ratio should be greater than 1, and its desirable value ranges between 1.2 and 2.0 (Sierpińska & Jachna, 2004, pp. 147–200). For enterprises, and especially for their owners, such a high ratio is not favorable. In 2023, the current ratio reached 0.84, i.e., a better level, which significantly improved the situation in terms of settling short-term liabilities. Relating the final result of the indicator to the analysis conducted in the years 2017–2019 by Sankowska and Kołoszko-Chomentowska (2022, p. 64), a slight improvement in the value of the current ratio was observed. Meanwhile, the average current ratio for the industry in Poland, in the analyzed years, calculated based on the financial data provided by Statistics Poland reached much higher values at the level of 1.47 (Industry Indicators, 2019–2023).

The value of Dino Polska S.A. quick ratio in the period under review oscillated around 0.2. This result is significantly lower compared to the results of the analysis conducted in the years

2017–2019 by Sankowska and Kołoszko-Chomentowska (2022, p. 64). At that time, the quick ratio was at a slightly higher level of 0.35. For an enterprise, this level of an indicator is a warning signal, because such a low ratio indicates problems if a need arises to cover short-term liabilities using liquid assets. In such a case, the company will be forced to seek other sources of funding. On average, the indicator value was significantly higher in the analyzed years and amounted to 0.84 in the discussed industry (Industry Indicators, 2019–2023).

The company cash ratio over the analyzed period remained at the level of approx. 0.06–0.23. In 2019–2020, there was a higher value than the theoretically correct one, but this it is not a problem, as it does not deter potential investors, and can be interpreted as, e.g., raising funds for investment. Higher level of cash provides the company with some security in case of bad debts from customers. If it does happen, the company will be able to pay its current obligations on time (Garbusewicz, 2014, pp. 337–356). From 2021–2023, the cash level has stabilized at the recommended level. Earlier analysis showed that the cash ratio was higher reaching 0.28 in the years 2017–2019 (Sankowska & Kołoszko-Chomentowska, 2022, p. 64). In the industry, the average value of cash ratio during the analyzed time was also lower reaching the higher of 0.31 (Industry Indicators, 2019–2023).

Debt analysis complements and expands the liquidity analysis, as it includes the level of debt service (installments and interest) and all liabilities. Western standards indicate that debt ratios should range from 0.57 to 0.67, as the balance between borrowed capital and equity is not disturbed (Kożuch & Dyhdalewicz, 2004, p. 264). It is also assumed that approx. 50% of an entity assets can be funded with borrowed capital (Gołębiowski, 2016, p. 193). The values of debt indicators for the analyzed company in the period under study are shown in Table 7.

Table 7

Debt indicators in the period 2019–2023

Specification	2019	2020	2021	2022	2023
Debt ratio	0.63	0.59	0.57	0.53	0.46
Debt-to-equity ratio	1.68	1.46	1.33	1.14	0.85
Long-term debt ratio	0.53	0.54	0.36	0.26	0.16

Source: Own compilation based on the data presented in Dino Polska S.A. annual reports.

In 2019, the ratio was at the level of 0.63 and this value is considered optimal. It means that borrowed capital was half the amount of equity. In 2023, the debt ratio was already as low as 0.46. It showed that the company was becoming increasingly independent. The level of the ratio, according to the analysis conducted in previous years amounted to 0.68 (Sankowska & Kołoszko-

Chomentowska, 2022, p. 70). The average value of debt ratio for the industry in Poland, in the analyzed years, presented the level of 0.58 (Industry Indicators, 2019–2023).

At the beginning of the analysis, the debt-to-equity ratio for Dino Polska S.A. was 1.68, which far exceeded the suggested optimal value of less than 1. The average ratio value for the industry was 1.42 at the time (Industry Indicators, 2019–2023). An earlier study by Sankowska and Kołoszko-Chomentowska (2022, p. 70) showed that the debt-to-equity ratio was even higher in the years 2017–2019, reaching the value of 2.53 at that time. Such a value indicated that the company was in debt as of 2017. The situation improved during the period under review, and in 2023 the ratio value was only 0.85, which indicates the good condition of equity. Between 2019 and 2023, the long-term debt ratio dropped from the level of 0.53 to 0.16, where the recommended value for this indicator should be less than 1. The downward trend is a positive development, as it shows a continuous improvement in the company creditworthiness and reliability. The average value of debt-to-equity for the industry in Poland was 0.22 (Industry Indicators, 2019–2023).

One of the indicators used to assess profitability is the return on assets (ROA), i.e., the assets of the company. The higher the value of the indicator, the better the financial standing of the entity. As a result, high values of this indicator inform about high profitability of total assets (Gad, 2015, p. 73). Profitability indicators are shown in Table 8. In the case of ROA, the ratio increase of approx. 4% was recorded in the analyzed company, which means that the situation of Dino Polska S.A. was improving and a higher efficiency in generating profits through assets was observed. In the last year of the analysis, the return on assets amounted to 13.5%. The return on assets of the analyzed Dino Polska S.A. company is higher than the industry average for the same period, which presented the level of 8.24% (Industry Indicators, 2019–2023).

The return on sales (ROS) ratio shows the percentage of revenue which remains in the company after subtracting all costs. This means that for every zloty of sales revenue, the company generated approximately 5.86 groszes of net profit. The return on sales ratio for the industry amounted to 3.45% at that time (Industry Indicators, 2019–2023).

Table 8

Profitability indicators in the period 2019–2023 [%]

Specification	2019	2020	2021	2022	2023
Return on sales (ROS)	5.37	6.36	6.03	5.72	5.48
Return on assets (ROA)	9.44	11.56	11.23	12.57	13.54
Return on equity (ROE)	25.33	28.41	26.23	26.93	25.07

Source: Own compilation based on the data presented in Dino Polska S.A. annual reports.

Return on equity (ROE) averaged more than 25% during the period covered by the analysis. It was a highly favorable result for the enterprise, as the long-term bank deposits and bond rates were higher, which may encourage the potential investors to purchase company shares. The average return on equity for enterprises in the discussed industry at that time was approx. 20% (Industry Indicators, 2019–2023).

The detailed results of Dino Polska S.A. efficiency indicators are shown in Table 9. The asset turnover ratio for the analyzed period suggests that the efficiency of asset management at Dino Polska S.A. was improving year to year. It is a positive development, which indicates the increasing sales revenues of the company. At the beginning of the studied period, the ratio was 1.76, whereas at the end it amounted to 2.48. The fixed asset turnover ratio also showed an upward trend, having increased by more than 1.5 times over the 2019–2023 period. In practice, it means that the value of sales revenues compared to fixed assets was increasing each consecutive year, thus working in favor of the company.

The inventory turnover ratio, receivables turnover ratio and liabilities turnover ratio also presented favorable results in the surveyed company, e.g., the inventory turnover averaged 11 times per year. This indicator showed lower values in the last year of the analysis, indicating an increase in the inventory backlog. In the years 2017–2019, according to Sankowska and Kołoszko-Chomentowska (2022, p. 68), the ratio was higher, at approx.13 inventory turnover cycles per year. Dino Polska S.A. showed lower indicator values as compared to the average ratio reported by the companies operating in this industry in Poland, where an average inventory turnover was 40 times per year (Industry Indicators, 2019–2023).

Dino Polska S.A. received the receivables from contractors 78 times in 2023. At the beginning of the analysis, it happened even more frequently, i.e., 98 times in 2019, and 117 times in 2020. The source literature does not provide a benchmark for a given indicator, but it should depend on the waiting time for payment that the company is willing to accept from its customers (Garbusewicz, 2014, pp. 337–356). The analysis of current liabilities in the studied enterprise shows that the value of short-term liabilities turnover ratio was increasing in each consecutive period. It resulted in a reduction of the current liabilities repayment period from 89 days in 2019 to 55 days in 2023. The average short-term liabilities settlement period for enterprises in the discussed industry was 67 days at that time (Industry Indicators, 2019–2023).

Table 9

Efficiency (activity) indicators in the period 2019–2023

Specification	2019	2020	2021	2022	2023
Asset turnover ratio	1.76	1.82	1.87	2.20	2.48
Fixed asset turnover ratio	2.38	2.50	2.58	3.14	3.60
Inventory turnover ratio	12.25	11.57	9.73	10.01	9.73
Receivables turnover ratio	97.88	116.63	92.78	72.04	77.66
Short-term liabilities turnover ratio	4.09	4.87	4.45	5.37	6.62

Source: Own compilation based on the data presented in Dino Polska S.A. annual reports.

The conducted analysis of Dino Polska S.A. financial statements covering the period 2019–2023 shows that the company overall situation was very good, as evidenced by the provided results. The company was generating higher revenues from its operations year to year. Despite the growing costs and income tax paid, Dino Polska S.A. increased its annual net profit by approx. 3.5 times (from PLN 410,907 thousand to PLN 1,405,327 thousand) between 2019 and 2023. Such financial results mean that the enterprise can look forward to the future with optimism. The company coped particularly well with the difficult period of 2020–2021, when the COVID-19 pandemic prevailed in Poland and many businesses collapsed or made large losses. In this period, no major problems were observed in Dino Polska S.A. financial results (Dino Polska S.A., 2021, p. 12). Another positive aspect was a significant decline in long-term and short-term liabilities, which made the company increasingly independent and, in addition, it continued to develop and invest in new stores or distribution centers. If one was to look for the weak points of Dino Polska S.A., the results of liquidity indicators could be slightly better, because in the event of an unforeseen increase in costs, a problem with solvency may occur. The company can also focus on further improvement of its profitability indicators, as their higher values translate into a better financial standing.

Conclusion

The correctly conducted analysis results in specifying these factors which most affect the company situation. Based on these tools, it is possible to react adequately, make decisions and choose a different path of development. Financial analysis tools allow accurate estimation of the financial standing presented by a particular company, which is useful not only to managers, but also to potential investors who would like to purchase company shares in the future.

The main purpose of the study was to assess the financial situation of Dino Polska S.A. in the period 2019–2023. The research problem addressed, which involved analyzing the assets and financial situation, allowed us to achieve the research objective. The research hypothesis was positively verified, as the development strategy pursued by Dino Polska S.A. guarantees the dynamic growth of the chain and improvement of its financial situation.

The economic and financial analysis confirmed a good financial condition of the studied company. It is consistently increasing its sales revenues and, in addition, each fiscal year is closed with a higher net profit from its operations. Dino Polska S.A. shows a considerable potential for further growth, as it maintains a high rate of new store openings, and also plans to build more distribution centers to reduce operating costs.

In addition, the company's good financial condition is evidenced by comparing sales revenues generated by Dino Polska S.A. with those of other grocery retail chains operating in Poland. Each consecutive year, Dino Polska S.A. grows stronger and is currently ranked as the third force on the Polish market, second only to two foreign-owned discounters – Lidl and Biedronka (Mandel, 2025).

Having considered that Dino Polska S.A. is a company majority-owned by Polish capital, which has been operating in the market for a relatively short period of time, all of its economic and financial results are good. It should be noted that the business strategy of the analyzed company has been well developed and its potential maximized. Dino Polska S.A. has found a favorable space in the market regarding the location of its stores, predominantly in smaller towns with little competition. In this way, the company strategy does not have to be changed, but can be continued along with all its assumptions. Dino Polska S.A. is a highly recognizable grocery retail chain in the Polish market generating high profits, which offers a chance to introduce further innovations and new technologies more readily in the future.

The analyzed financial statements of Dino Polska S.A., covering the period of 2019–2023, showed a good financial situation of the company. The balance between assets and liabilities was maintained providing the basis for profitable operations. The company secured smooth operation in conducting further business activities by applying a safe and responsible financial policy, even if unexpected events were to occur. It is confirmed by the results of 2019–2023 indicators.

The operational efficiency and debt presented the most favorable results, significantly above the adopted value levels respective for each of these indicators. The company must certainly consider improving the quick ratio and cash ratio, because financial problems may occur in the event of unexpected expenses. However, the low values of liquidity indicators can be partly explained by the fact that Dino Polska is a dynamically developing retail chain that relies on a short operating cycle and fast-moving goods turnover.

It is recommended to maintain timely sales revenues and appropriate inventory turnover within the company, as well as to accumulate cash reserves, which can increase financial security during market fluctuations. The analysis results can be useful for further research considerations, but can also serve as information for current and potential investors, market analysts, and the company's management in the decision-making process.

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