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DIGITAL TRANSFORMATION AND ECONOMIC RECOVERY IN THE POST-CRISIS PERIOD

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The tenth annual scientific conference of the Monetary and Economic Research Center (MRC) was held from 18th to 20th of November 2024 at the University of National and World Economy (UNWE) in Sofia, Bulgaria.

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Main accent on the 10th Annual Conference was digital economic challenges and euro acception in Bulgaria. Researchers and professionals from 12 countries took part. The total number of participants was over 400.

The present book consists papers in English and Bulgarian languages.

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ИДЕИТЕ И РОЛЯТА НА ЛЕО ПАСВОЛСКИ ЗА СЪЗДАВАНЕТО НА МЕЖДУНАРОДНИЯ ВАЛУТЕН ФОНД ПРЕДИ И ПО ВРЕМЕ НА ВТОРАТА СВЕТОВНА ВОЙНА

Михаил Раев [1]

LEO PASVOLSKY'S IDEAS AND ROLE BEFORE AND DURING WWII IN THE FOUNDING OF THE INTERNATIONAL MONETARY FUND

Mikhail Raev[2]

Abstract: *The eightieth anniversary of the International Monetary Fund's establishment during the Bretton Woods conference allows a reflection on the role of Leo Pasvolsky in its creation. After the introduction, using historical and epistemological methods, the article illuminates Pasvolsky's public image in its second paragraph. The following paragraph deals with his life, works and main ideas. The fourth paragraph focuses on Pasvolsky as a planner of the post-WWII global order. Cordell Hull, the Secretary of State, entitled Leo Pasvolsky to establish and supervise various divisions within the State Department from 1939 till the end of the war. The next paragraph focuses on Pasvolsky's ideas for creating an organization similar to the IMF in the 1930s and early 1940s. The conclusion emphasizes that Pasvolsky regarded the establishment of the IMF, IBRD, and the WTO as part of the UN organizations that aimed to keep the peace between the belligerent countries in WWII.*

Keywords: Leo Pasvolsky; International Monetary Fund; free trade
JEL: *B310; F33; N42*

1. Увод

През 2024 г. се навършват осемдесет години от конференцията в Бретън Уудс (Bretton Woods Conference, 1-22 юли 1944 г.), която има своеобразно продължение по-късно в Дъмбъртън Оукс (Dumbarton Oaks Conference, 21 август – 7 октомври 1944 г.), и на която са положени основите на международната финансова архитектура след Втората

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световна война (Eckes, 1975). На тази конференция много експерти полагат сериозни усилия за откриването на взаимно изгодно решение за победителите и победените от световния конфликт, което няма да повтори грешките направени от страните от Антантата – победителите от Първата световна война. И докато уреждането на мирните отношения и репарации между Съюзниците и страните от Оста се решава на конференциите в Потсдам (1945 г.) и Париж (1947 г.), то в Бретън Уудс се договарят основните финансови институции – Международен валутен фонд и Международна банка за възстановяване и развитие, които да подпомогнат победените страни, така че да не се радикализират в бъдеще и да не се разруши планираната организация на Обединените нации (Schild 1995; Conway 2015).

Хари Декстър Уайт от страна на САЩ и Джон Майнърд Кейнс от страна на Британската империя, както и техните ключови роли за създаването на двете институции, са предмет на сериозни изследвания и вероятно ще продължат да са в центъра на проучванията на бъдещите икономически историци (Steil, 2013; Conway, 2015; Boughton, 2022). Предмет на настоящото изследване, обаче, не са двамата известни икономисти, а личността на Лео Пасволски, както и неговите идеи и решаваща роля за тяхното създаване. Самият той е участник в конференциите в Бретън Уудс, Дъмбъртън Оукс и Сан Франциско, но остава в сянка за голяма част от съвременните изследователи (Domhoff, 2014, p. 1-41; Weisbrode, 2009, p. 366-391; Williams, 2017, p. 91-113).

2. Оценки за Лео Пасволски относно създаването на следвоенния световен ред

За Лео Пасволски може да се открият редица противоречиви мнения, които са публикувани през последните седемдесет години. След смъртта му на 5 май 1953, съобщението за неговата кончина, публикувано в Ню Йорк Таймс, е допълнено със следното заглавие „Написа устава на Международната организация“ (New York Times. May 7, 1953). Авторът е имал предвид не само написването на самия устав, но и ключовата роля на Пасволски за създаването на системата от международни институции, формиращи Организацията на обединените нации. По отношение на ООН, сенатор Томас Конъли отбелязва в мемоарите си, че „Пасволски е изключително способен и беше единственият човек, към когото всички се обръщахме за обяснение на детайлите по устава. Определено той има много по-голяма заслуга, от когото и да е, за написването на устава“ (Connolly, Steinberg 1954, p. 279).

Друг участник в тези процеси от страна на Държавния департамент, Ийстън Ротуел, споделя, че „идеята за нова международна организация в края на войната се зароди с нашето влизане във войната, и даже дори преди да влезнем, в ума на Лео Пасволски. Действителният архитект на ООН не е Франклин Рузвелт, не е Кордел Хъл (държавния секретар). Лео Пасволски е човекът, който я създаде.“ (Rothwell, 1985, pp. 94-95).

В началото на XXI в. Ричард Холбрук отбелязва в своята статия "Last Best Hope" (New York Times, September 28, 2003) своята висока оценка за Пасволски. За него той е човек с редки личностни качества във Вашингтон, поради това, че е неуморен бюрократ, който поставяйки си една единствена цел, я преследва докрай. Холбрук отбелязва, че

Пасволски оставя огромно наследство и въпреки това буквално изчезва от историческите анали.

Според Андрю Уйлямс, Пасволски оставя огромен отпечатък в световното развитие предвид неговата официална позиция (Williams, 2017, pp. 91-92). Това се отнася за цялата система от организации, които формират Организацията на Обединените нации, поради което неговият архив, който се съхранява в Библиотеката на Конгреса обхваща основно периода между 1944 и 1945 г. Друг изследовател, Хари Блутстайн, споделя, че шегата на Историята се състои в това, че докато създаването на цялостната система на Организацията на Обединените нации е основно американски проект, то неговият главен архитект е белоемигрант (Blutstein, 2016, p. 25).

Болшинството от писмата, работните документи и проектите, които е изготвял Пасволски, се откриват в архивните колекции на неговите кореспонденти, а не в неговия архив в Библиотеката на Конгреса или Националните архиви. Именно първата институция предлага следната кратка биографична информационна бележка, свързана с него (Leo Pasvolsky Papers).

3. Кратка биография и трудове на Лео Пасволски

Лео Пасволски е роден на 22 август 1893 г. в Павлоград, Руската империя (дн. Украйна). През 1905 г. неговото семейство емигрира в САЩ поради интензивните антиеврейски преследвания. Пасволски завършва висше образование по икономика в Сити Юнивърсити (City University of New York) през 1916 г., а през следващите две години работи върху докторска дисертация по политически науки в Колумбийския университет, която не защитава. Между 1916 г. и 1920 г. Пасволски работи като редактор и журналист на свободна практика в изданията: Russian Review, Русское слово, Американский Вестник. В периода от 1922 г. до 1953 г. той е член на научния състав, първо, на Икономическия институт, а от 1928 г. и на Брукингс Институшън (Brookings Institution). По-късно през 1932-33 г. Пасволски учи в Университета в Женева, а през 1936 г. Брукингс Институшън му дава титлата доктор по икономика. От 1934 г. Пасволски е привлечен в Бюрото за чуждестранна и местна търговия към Държавния департамент. Между 1935 и 1936 г. той оглавява Отдела за търговските споразумения, а през 1936 г. е издигнат за специален съветник и асистент на Кордъл Хъл (Cordell Hull), Държавен секретар на САЩ. През 1938 г. Пасволски напуска Държавния департамент и се завръща в Брукингс. От септември 1939 г. той се завръща в Държавния департамент и е основен плановик за уреждане на след-военното устройство на света в рамките на американската администрация. За Шлесингер, Пасволски е перфектният държавен служител за Хъл: непротиворечив, но принципен, с широко-обхватни знания за световните дела, с вяра в свободната търговия и с огромно желание да остане в сянка (Schlesinger, 2004, p. 43). Той продължава да заема този пост до 1946 г. при новите държавни секретари, Едуард Стетиниус (Edward R. Stettinius Jr.) между 1944 и 1945 г., и Джеймс Бърнс (James F. Byrnes) между 1945 до 1947 г.

През 1944 г. Пасволски е член на американската делегация на конференциите в Бретън Уудс и Дъмбъртън Оукс. На следващата година той е член на американската делегация на конференцията в Сан Франсиско, която урежда създаването на

Организацията на Обединените нации, и е председател на първата сесия на подготвителната комисия. През 1946 г. Пасволски напуска Държавния департамент и е назначен за директор по международните изследвания в Брукингс Институшън. Той умира на 5 май 1953 г. (Leo Pasvolsky Papers)

Между 1921 и 1933 г. Пасволски публикува редица изследвания за Икономическия институт / Брукингс Институшън. В първите си две изследвания, той разглежда проблема с руския предвоенен и военен дълг. (Pasvolsky 1921; Pasvolsky 1922). Заедно с проф. Харолд Мултън, директор на Икономическия институт, той обобщава изследванията по този въпрос с обща публикация. (Moulton, Pasvolsky, 1924). Това се превръща във форма на колаборация, която дава плод в още две съвместни издания (Moulton, Pasvolsky, 1926; Moulton, Pasvolsky, 1932). В тези свои изследвания Пасволски и Мултън анализират направени грешки от САЩ в преговорите и създаването на световния ред след Първата световна война. Една от тях е в първоначалната американска подкрепа за създаването на Обществото на народите. Впоследствие отказът на Конгреса да ратифицира договора за членство на САЩ в тази международна организация оставя разрешаването на проблемите с военновременните дългове и репарации на другите две световни сили победителки от войната, а именно Франция и Британската империя. Те действат късогледо и предизвикват редица политически и икономически проблеми в международните отношения през 20-те години на XX в.

В общия им труд *World War Debt Settlements* от 1926 г., Мултън и Пасволски предлагат обобщение на серия от публикации на сътрудници на Икономическия институт, в които се разглеждат военновременните дългове и репарации на държавите наследници на Германия, Австро-Унгария, Италия, Франция, Белгия и Великобритания. Авторите обясняват за широката читателска аудитория, че ако една страна е взела чуждестранни дългове в американска валута, то тя трябва да продаде стоки и услуги на световния пазар в същата валута, за да може да получи излишък от тази валута, с който да разплати главницата и начислената лихва, за да обслужи дълга си. По сходен принцип се разплащат и военните репарации – страната трябва да има положително търговско салдо, за да спечели чуждестранна валута и да се разплати по чуждестранните си задължения (Moulton, Pasvolsky, 1926, pp. 1-9). Този проблем се очертава особено ясно скоро след подписването на Версайския мирен договор през 1919 г. Когато Германия изпитва затруднения с разплащането на годишните вноски по репарациите, тогава Франция и Великобритания изпитват затруднения с изплащането на дължимите вноски по военновременните си заеми към САЩ. В отговор на тези проблеми и зависимости, Конгресът на САШ одобрява създаването на Комисия по урегулирането на военновременните чуждестранни дългове на 9 февруари 1922 г. Комисията трябва да изработи насоките при преговорите за обслужването на дълговете. Много скоро след създаването на Комисията, САЩ предлагат водещ принцип да бъде възможността на държавата да се разплати по дълговете си. Британската империя приема валидността на този принцип, но Франция изказва своето несъгласие. Поради това, когато Германия обявява, че не може да обслужи годишната си вноска по репарации за 1922 г., то армиите на Франция и Белгия окупират Рурската област през януари 1923 г. Това води до ескалацията на конфликта и поставя под натиск отношенията между европейските държави. САЩ предлагат плана „Дос“ (Dawes Plan) през 1924 г., в който заляга принципа

за способностите на страната да обслужва дълговете си (Moulton, Pasvolsky, 1926, pp. 10-23).

Пасволски и Мултън защитават тезата, че САЩ следва икономическа политика за положителен търговски баланс, докато Британската империя цели постигането и задържането на пълната заетост на своята икономика. Авторите разкриват, че това е причината зад решението на САЩ да кредитира всички европейски страни, за да задържат индустриалните и търговските си възможности. Втора стъпка, която предприема американското правителство в облекчаване на международната търговия, е в трансформиране на германските репарации от обществени задължения в частен дълг на американското правителство чрез емитиране на облигации, които да покрият репарации на Германия към американското правителство и ги предлагат на американските данъкоплатци. Тези книжа са обезпечени с печалбата на германските железници. В този смисъл Пасволски и Мултън обясняват германската позиция и нуждите на страната от изграждането на индустриален капацитет за износ на стоки, за да може с положителния баланс да се акумулира чуждестранна валута за обслужването на репарационните задължения към съюзническите страни и новия дълг към САЩ. Авторите са доста скептични към възможността победените страни да имат способността да обслужват безпроблемно огромните репарации и лихвите по тях през следващите 62 години, тъй като няма гаранция, че една държава може постоянно да поддържа своя положителен търговски баланс толкова дълго. Освен това, Пасволски и Мултън отбелязват, че интересите на страните-победителки може да се сблъскат с частните интереси, коя страна да поеме загубите в случай, че победената страна не може да обслужи дълга си и обяви фалит (Moulton, Pasvolsky, 1926, pp. 106-143).

Пасволски и Мултън правят една прогноза в своята публикация от 1926 г., която се оказва пророческа. Въпреки че след серията от преговори, военновременните и репарационни задължения да изглеждат уредени на международно ниво, основните икономически проблеми, т.е. външнотърговските отношения и излишъка в търговското салдо, които принуждават страните да влезнат в Първата световна война и водят на няколко пъти до разстройване на международните отношения след 1919 г. са все още открити. Планът „Дос“ от 1924 г. и последвалите споразумения по уреждането на дълговете създават един своеобразен пет-годишен изпитателен период за цялата рамка на международните отношения. Пасволски и Мултън предвиждат че в рамките на този период ще се прояви събитие, което ще тества съществуващия баланс, както по отношение на възможността на страните-длъжници да обслужват дълговете си, така и в желанието на страните-кредитори да се откажат от някаква част от бъдещите си вноски (Moulton, Pasvolsky, 1926, pp. 126-143).

След 1926 г. Пасволски прави серия от посещения в държавите по р. Дунав и България, по време на които дискутира техните икономически проблеми, потенциал и перспективи (Pasvolsky 1928; Pasvolsky 1930).

През 1932 г. Пасволски и Мултън написват последната си съвместна книга със заглавието *War Debts and World Prosperity*. В нея те изясняват, че егоистичните търговски политики на страните-победителки, включително и САЩ, довеждат до Голямата Депресия, която се задълбочава поради серията от търговски и тарифни войни. Дори създаването на Банката за международни разплащания, която има за цел урегулирането на военновременните дългове и репарации между победителите и победените страни в

конфликта, не може да повлияе положително на възможността Германия да обслужва дълговете си. В резултат от загубата на възможности за износ спада продукцията на немската индустрия, което от своя страна води до спадане на товарните превози от страна на немските железници. Това от своя страна довежда до загуби и води до спад в цената на облигациите, закупени от американските граждани. Продължителните търговски войни водят до натрупване на стока в складовете на фирмите и до масовите съкращения на милиони работници, които се включват в радикални леви и десни партии и движения (Moulton, Pasvolsky, 1932, p. 3-21, 369-422).

Последното изследване на Пасволски преди постъпването му на работа в Държавния департамент е забележително със заглавието си *Current Monetary Issues*. Той предлага преглед на всички проблеми, които изникват в американската икономика, след настъпването на Голямата Депресия и какви са възможностите за техните решения. (Pasvolsky, 1933a) Дори в рамките на своята кариера в Държавния департамент, Пасволски никога не прекъсва контактите си с Брукингс Институшън или Американската асоциация на икономистите.

4. Лео Пасволски като плановик на след-военния свят

За отбелязване е, че освен работоспособността и широките познания, Пасволски споделя с Президента Франклин Делано Рузвелт, държавния секретар Кордъл Хъл и държавния подсекретар Съмнър Уелс, вярата в свободната търговия и отпадането на всички митнически режими между държавите по света. Той мисли, че подобно глобално развитие ще бъде в полза на националните интереси на САЩ. Вероятно това е причина за бързото му кариерно израстване (Williams, A., 2017, 98-100).

Кордъл Хъл споделя в спомените си, че след избухването на войната между Германия и Полша през септември 1939 г. той предлага на Пасволски да се завърне в Държавния департамент като специален асистент, който да започне подготовка на плановете за след-военния мирен ред и ролята на САЩ в него (Hull, 1948, p. 1626). В резултат на възлагането на тази задача, Хъл одобрява създаването на Консултативен комитет по проблемите на външните работи (Advisory Committee on the Problems of Foreign Relations) под председателството на държавния подсекретар Съмнър Уелс и с изпълнителен директор Пасволски. През лятото на 1940 г., комитета е разпуснат, а през февруари 1941 г. на негово място е създаден Отдел за специални изследвания (Division of Special Research) под ръководството на Пасволски. От януари 1943 г. отделът е разделен на две: отдел за политически изследвания (Division of Political Studies) и отдел за икономически изследвания (Division of Economic Studies), като и двата отдела са под неговото ръководство (Notter, 1975).

Същевременно Пасволски оглавява или е член на два други комитета: Междуведомствената група за разглеждане на следвоенните международни икономически проблеми и политики (Interdepartmental Group to Consider Post-War International Economic Problems and Policies) между май и юли 1940 г. и Консултативният комитет по следвоенна външна политика (Advisory Committee on Postwar Foreign Policy) от февруари 1942 г. Междуведомствената група е формирана от представители на четири министерства (Държавен департамент, Ковчежничество, Търговия и Земеделие) и се

председателства от Пасволски. От страна на Ковчежничество участник е Хари Декстър Уайт (Rofe, 2012, pp. 254-279).

Консултативният комитет по следвоенна външна политика има подкомитети по политическите проблеми, икономическото възстановяване, териториалните въпроси, правните въпроси и създаването на международната организация. Той се председателства от Кордъл Хъл, със заместник Съмнър Уелс, и изпълнителен координатор Лео Пасволски. Към Комитета са включени експерти от Държавния департамент, Ковчежничество и Търговията. Освен тях, към него са привлечени редица професионалисти извън държавната администрация, повечето от които са членове на Съвета за външни работи като Хамилтън Фиш Армстронг (Hamilton Fish Armstrong), Исая Боумън (Isaiah Bowman), Норман Дейвис (Norman H. Davis), Мирон Тейлър (Myron Taylor) и др. След четири заседания Комитета се разпада на подкомитетите, които се събират под ръководството на Пасволски. В началото на 1943 г. ролята на Комитета е заменена от Неформалната група за политическия дневен ред, която се състои от Хъл, Уелс, Тейлър, Дейвис, Боуман и Пасволски (Shoup, Minter, 1977).

Въпреки че планирането на следвоенния ред и ролята на САЩ в него е колективно усилие, Лео Пасволски се откроява със своята централна роля на координатор и свързващо звено между Държавния департамент, останалата част от администрацията на Франклин Делано Рузвелт и Съвета за външни работи. Съветът е създаден по време на Първата световна война от група учени, правителствени експерти, адвокати и предприемачи под егидата на Президента Удроу Уилсън. Съветът си поставя за цел да подпомогне правителството да дефинира националните интереси на САЩ по света. Пасволски е поканен за член на съвета през 1938 г. (Shoup, Minter, 1977) Той не само ръководи своя отдел, но и възлага определени проучвания да се извършат от групи към Съвета за външни работи известни официално като Изследвания на американските интереси във война и мир (Studies of American Interests in the War and the Peace), а неофициално Групи за изследвания във война и мир (War and Peace Studies). Те се състоят от около 45 члена на Съвета за външни работи, а тяхната дейност се осъществява с грант от фондация Рокфелер. Начело на Икономическата и финансова група са проф. Алвин Хансен от Харвардския университет и проф. Якоб Винер от Чикагския университет. Пасволски присъства на всички срещи на тази група в Ню Йорк и Вашингтон, а Хансен и Винер му докладват по отделни възложени задачи (Schulzinger, 1984, p. 81; Nerozzi, 2009, p. 27). В някаква степен, Пасволски се припокрива в своята дейност с ролята и функциите на проф. Винер, който е външен съветник на Хенри Моргентау Мл., Секретар на Департамент Ковчежничество, по Новата сделка (New Deal) след 1934 г. и играе ключова роля за това министерство до края на Втората световна война. Винер предлага на Хари Декстър Уайт позиция в Ковчежничеството през 1934 г. Вероятно с негова подкрепа, Моргентау създава специален отдел за парични изследвания, който Уайт оглавява. През 1941 г. Уайт е повишен в асистент на Секретаря, а през 1945 г. той е издигнат за Асистент Секретар на Ковчежничество – позиция сходна с тази на заместник министър на финансите.

В рамките на работата си в различните формати на комитети и групи по време на Втората световна война, Пасволски възлага на Уайт извършването на определена техническа работа, включително създаването на проект за устав на МВФ. Уайт, обаче,

не е член на Съвета за външни работи и получава информацията за проведените изследвания опосредствано чрез Пасволски или Винер.

5. Лео Пасволски и идеите за създаване на Международния валутен фонд

Въпреки че редица автори акцентират ролите, които Хари Декстър Уайт и Джон Майнърд Кейнс изиграват за създаването на МВФ в началото на 40-те години на XX в., всъщност нуждата от създаването на подобна международна организация започва да се осъзнава скоро след създаването на Банката за международни разплащания през 1930 г. Пасволски и Мултън оценяват като неуспех фалстарта във функционирането на Банката и невъзможността ѝ да реши проблемите с репарационните заеми и военновременните дългове по време на Голямата Депресия (Moulton, Pasvolsky 1932, p. 198-203, 218-220, 225-227, 335-343).

През 1934 г. Якоб Винер помага при създаването и управлението на Стабилизационния фонд на обменния курс в рамките на Ковчежничеството на САЩ, който е своего рода предшественик на МВФ. През 1935 г. той помага на Моргентау да проведе преговорите с Британската империя и Франция за ползването на националните стабилизационни фондове на обменния курс за успокояване на резките движения в обмена на техните валутните курсове (Blum, 1959, pp. 131-134). Този тристранен договор, към който впоследствие се присъединяват още няколко държави, е на една или две стъпки от създаването на международен стабилизационен фонд.

През 1933 г., докато учи в Женева, Пасволски публикува меморандум озаглавен The Necessity for a Stable International Monetary Standard, който подготвя за VII общ конгрес на Международната търговска камара, който се състои във Виена в периода 29 май –3 юни 1933 (Pasvolsky, 1933b). Малко по-късно през 1937 г. той написва паметна бележка до Държавния подсекретар Съмнър Уелс, в която идентифицира следните цели: “постепенно отпускане и евентуално изоставяне на такива извънредни пречки пред търговията като квотите, коригирането на необосновано високите нива на митническата тарифа в посока надолу, твърдото възстановяване на принципа на най-облагодетелствана нация, стабилен валутен обмен, пренастройване на съществуващите международни дългови задължения, възстановяване на международното кредитиране и създаването на защити против дъмпинга“ (Goodwin, 1998, p. 92). Тук Пасволски се солидаризира с Винер, който посвещава специално изследване на дъмпинга като некоректна практика в международната търговия (Viner 1923). Пасволски препоръчва ползването на двустранни и многостранни договори за постигането на гореизброените цели. Той е в подкрепа на създаването на комитет с представителите на шест нации, за да изследват идеите и предложенията, които могат да възникнат, включително за създаването на един Международен фонд, който да облекчи проблема с обмена на чуждестранни валути (Goodwin, 1998, p. 92).

На друго място Пасволски развива някои от тези идеи. Той отбелязва, че гъвкавият валутен курс подкопава увереността и води до намаляване на търговията, тъй като правителствата и предприемачите не искат да поемат валутния риск. Фиксираният обменен курс на основа на златото ще възстанови увереността и ще възстанови търговията. Тристранният договор между САЩ, Британската империя и Франция, е

важен прецедент, тъй като предлага чрез международно сътрудничество да се извърши необходимата обезценка без да се налага нов кръг от последващи намаления (Acsay, 2000, p. 206). Аксай предполага, че това изследване служи като основа за по-късната чернова на Уайт за МВФ (Acsay, 2000, pp. 206-207). Не е сигурно, какво съчинение цитира Аксай, тъй като горното наблюдение преписвано на Пасволски не се открива в цитираната му статия от 1941 г. (Pasvolsky, 1941). През тази година Пасволски изготвя меморандум за създаването на МВФ, който обаче не получава политическо одобрение и не е изпратен в Лондон и на Кейнс за коментари (Penrose, 1953, p. 41; Gardner, 1956, p. 72) Британците разбират за този план от своите източници, което ги стимулира да разработят свое алтернативно предложение. Поради секретността в рамките на Държавния департамент, те приемат Пасволски за човек от обкръжението на Уайт, и не са наясно с важността на ролята му (Van Dormael, 1978, p. 48).

В много от своите вътрешни доклади до Кордел Хъл Пасволски акцентира на необходимостта от икономическо и финансово споразумение между европейските страни след Втората световна война, което да им позволи да достигнат дълготраен мир. Според него в рамките на американските интереси е САЩ да доминира в новия световен ред. Основни елементи на тази нова роля са следването на основните идеи за разумни международни икономически отношения, които САЩ успяват да разпространят широко до Втората световна война; твърдата решимост за пренасянето на тези идеи на практика; желанието да използва огромните си икономически и финансови ресурси за постигането на тези цели (Pasvolsky, 1941, p. 336) Пасволски и Мултън работят над предложение за финансиране на проучване от страна на Брукингс Институшън към фондация „Карнеги“, което внасят през януари 1941. Там те излагат следното: „Съществуват три алтернативи пред Съединените американски щати: 1) да поддържа политика на политическа, ако не и икономическа, изолация от Европа, докато разработва най-силната възможна защита; 2) да сключи политически и икономически съюз с Британската империя за целите на взаимната защита и конструктивно сътрудничество; 3) да се опита да работи, както с Британската империя, така и с тоталитарните режими, някаква нова концепция за световна организация, която да подсигури мир в бъдеще и да подкрепи икономическото възстановяване.“ (Goodwin, 1998, p. 90).

Освен структурите, формирани в рамките на Държавния департамент и на междуведомствено ниво, Пасволски успява да разпространи своите идеи и в рамките на Съвета за външни работи. В този смисъл, въпреки че Уайт разработва техническите детайли по създаването на МВФ и Международната банка за възстановяване и развитие, той не е член на Съвета. Може да предположим, че в рамките на срещите на Икономическата и финансова група на Съвета за външни работи през 1941 и 1942 г. се дискутират идеите на Пасволски. Вероятно в тези дискусии се формира концепцията за международните икономически институции, които да интегрират новия световен ред. Предвид на близките отношения между Винер и Уайт е много вероятно първият да е споделил на втория част от тези идеи. Уайт изработва меморандума за МВФ до март 1942 г., а Моргентау го представя пред Рузвелт до средата на май същата година. След серия от дискусии с държавния секретар Хъл се създава специален междуведомствен комитет за конкретизиране на плана. Срещите започват от 25 май 1942 г. Към комитета са привлечени експерти от Американския технически комитет, които детайлизират плана. Тези два комитета са разположени в Ковчежничеството и имат само формални връзки с

Консултативният комитет по следвоенна външна политика, който е разположен в Държавния департамент. Уайт служи като представител на Ковчежничеството в подкомитета по икономическа политика към Консултативния комитет.

След конференциите в Бретън Уудс и Дъмбъртън Оукс Лео Пасволски изнася доклад, адресиран към всички заинтересовани страни в САЩ, който е публикуван от Държавния департамент през 1944 г. Той споделя в него за достигнатите условия с останалите съюзнически страни (Pasvolsky, 1944).

Според Пасволски: „Конференцията от Хот Спрингс (май 1943) приключи с изработването на план за Международна организация за храни и земеделие. Конференцията в Лондон от пролетта на 1944 г., изведе на преден план идеи за потенциално създаване на международна образователна агенция. Конференцията от Бретън Уудс от юли тази година доведе до проекти за създаването на Международен валутен фонд и Международна банка за възстановяване и развитие. В настоящия момент е наличен прогрес на международната конференция по проблемите на гражданската авиация в Чикаго. Налице са дискусии за сходните действия в областта на търговията, товарите, картелните споразумения, другите форми на транспорт, комуникации, здравеопазване и др. Естествено, Международната организация на труда продължава да съществува.“ (Pasvolsky, 1944, pp. 5-6).

На тази конференция се разкрива нуждата от институция сравнима с МВФ и Световната банка по отношение на международна търговия. Тъй като конференциите в Бретън Уудс и Дъмбъртън Оукс са посетена от министри на външните работи и финансите или от управители на национални централни банки, или техни представители, то създаването на обсъжданата Международна търговска организация е отложено за по-късен етап през 1945 г. САЩ и Пасволски се опитват да създадат подобна организация в рамките на конференцията от Сан Франсиско, но и тогава решението е отложено. Поради ранните етапи на конфронтация в рамките на Студената война през 1946 г. опитите са преустановени, а Пасволски напуска Държавния департамент и се завръща към научна работа в Брукингс. След няколко опити все пак 23 държави подписват Общото споразумение за търговията и митническите тарифи през октомври 1947 г. (McKenzie, 2020, p. 26 - 61).

6. Заключение

В началото на изследването бяха цитирани няколко автора, които високо оценяват Лео Пасволски за написването на устава на Обединените нации. Трябва, обаче, да се вземе предвид, че той разработва план за създаването на всеобхватна международна организация, която да регулира и институционализира международните отношения и да посредничи при международни конфликти и дела. За тази цел, Пасволски дейно участва и формира различни тематични групи за изследване на наличните възможни сценарии, за определяне на нужните институции и техните функции, както и за създаването на техническите документи по тяхното институционализиране. Пасволски аргументира тезата, че бремето по обслужването на военновременните дългове и репарации след Първата световна война стои в основата за избухването на Втората световна война. Поради тази причина, световните лидери трябва да открият такива форми на

съжителство и сътрудничество след Втората световна война, така че да разрешават икономическите проблеми между отделните страни чрез серия от международни организации, а не чрез въоръжени конфликти. В този контекст, Международният валутен фонд и Международната банка за възстановяване и развитие имат своята роля в плановете за световен мир на Лео Пасволски, което налага и възлагането на задачи за създаване на концепции и програмни документи за тяхното основаване на различни негови подчинени и колеги в разнообразните формати за координация на научните усилия за следвоенен мир, в които той взима участие.

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THE IMPACT OF THE COMBINATION OF SCIENCE AND TECHNOLOGY AND FINANCE ON ECONOMIC RESILIENCE- EMPIRICAL EVIDENCE BASED ON QUASI-NATURAL EXPERIMENT OF "PROMOTING THE COMBINATION OF SCIENCE AND THCENOLOGY AND FINANCE"

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Abstract: *This paper raises the question of whether the difference in the level of financial development will lead to a difference in the implementation effect of the policy of "promoting the integration of science and technology and finance". The study found that the impact of policy on economic resilience is heterogeneous in cities with different geographical locations, political status and educational levels. In the regions with different levels of financial development, the policy of "promoting the integration of science and technology and finance" has different effects on economic resilience.*
Keywords: *FinTech Economic, economic resilience, level of financial development*
JEL: *G2; O3; E6; O1*

1. Introduction

The relationship between finance and economic stability is an important issue in economics. In recent years, countries have increasingly focused on economic resilience in the process of economic recovery. Economic resilience and its influencing factors have become a hot topic in current research (Petach, Weiler & Conroy, 2021; Bristow & Healy, 2017, p. 265-284;

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Petit, 2022, p. 377-398; Trippl, Fastenrath & Isaksen, 2024, p. 101-115). The Financial policy is an important factor affecting economic resilience (Gong & Hondroyiannis, 2023, p. 2493-2509). In the context of the rapid rise of the financial industry, China has enacted a series of financial policies to achieve long-term sound economic development, including the policy of "promoting the integration of science and technology and finance". The policy is proposed to support the development of start-ups and small and medium-sized enterprises, improving the efficiency of technological transformation and innovation-driven development capabilities. The policy of "promoting the integration of science and technology and finance" provides enterprises with diversified financing channels, which helps enterprises maintain stable development in economic uncertainty.

Previous studies have analysed the effectiveness of the implementation of "promoting the integration of science and technology and finance" policy by whether economic resilience has been improved (Guo & Chai, 2023, p. 1-10). But the evaluations of the implementation effect of the "promoting the integration of science and technology and finance" policy are lack of the level of local financial development. If the impact of differences in the level of financial development on policy implementation is not considered, it may lead to shortcomings in the evaluation of policy effectiveness. Therefore, this paper raised the quesiton is whether there are differences in the effect of the policy of "promoting the integration of science and technology and finance" on improving economic resilience under the different levels of financial development?

Based on panel data of 276 prefecture-level cities in China from 2009 to 2021, this paper considers the policy of "promoting the integration of science and technology and finance" as a quasi-natural experiment, using the difference-in-difference model and moderating effect model to explore the difference in the impact of the policy of "promoting the integration of science and technology and finance" on economic resilience at different levels of financial development. It is verified that the level of financial development can affect the implementation of the policy of "promoting the integration of science and technology and finance" and then affect the improvement effect of improving economic resilience. This paper hopes to break through the single analysis framework in previous studies, identifying the factors affecting policy implementation, making up for the lack of theoretical research, and providing a new perspective for the study of policy evaluation. At the same time, we can learn from this experience, providing an accurate basis for regional policy makers, ensuring the optimization of policy effects, and then maximizing economic resilience.

The structure of the rest of this paper is as follows: The second part introduces the literature review; the third part puts forward the research hypothesis. The fourth part introduces the model and variables. The fifth part carries out the empirical test, presenting the regression results and carrying out the robustness test. The sixth part is the conclusion and policy recommendations.

2. Literature review

2.1. "Promoting the integration of science and technology and finance" policy

So far, most research has focused on elucidating the various impacts of policies. Some scholars have identified that, for example, "promotion the integration of science and technology with finance" policy have a significant influence on carbon emissions (He et al., 2024), enterprise entry (Liu & Liu, 2024), low-carbon economic transformation (Zhang, Feng & Wang, 2024), local innovation (Ye, 2023), and green credit level (Zhao, Xin & Wang, 2024, p. 1074-1086). However, there is a scarcity of the studies that have focused on the influence of the policy environment on policy implementation. Consequently, there is a dearth of literature examining the impact of disparities in levels of financial development on policy implementation.

2.2. Economic resilience

The current literature on economic resilience is divided into two categories. The first is the concept of economic resilience. Briguglio, Cordina, Farrugia and Vella (2014, p.47-56) described economic resilience in two ways: the ability of the economy to recover from shocks, and the ability of the economy to withstand shocks. The second category is the influencing factors of economic resilience. Christopherson, Michie and Tyler (2010, p. 3-10) noted that innovation, infrastructure, a diversified industrial structure and a sound financial system have a long-term impact on economic resilience. Martin (2010, p.1-27) proposed that the regional economic structure, external resources, infrastructure, and residents' psychological factors would affect regional economic resilience. Hill et al. (2012, p.193-274) argued that the regional industrial structure, human capital, innovation capacity, policy environment and other factors have an impact on the regional economic resilience. Some scholars have proposed that financial development is conducive to improving economic resilience, and the impact of financial development on economic vulnerability is U-shaped (Nguyen & Su, 2021, p.237-252). Some scholars have also found that bias in scientific and technological progress can enhance economic resilience (Kuang & Fan, 2022, p.22-32). The structural characteristics of technological innovation can affect regional economic resilience (He et al., 2023, p. 4043-4070).

3. Research hypothesis

3.1. The policy of "promoting the integration of science and technology and finance", the level of scientific and technological development and economic resilience

The policy of "promoting the integration of science and technology and finance" enhances economic resilience by directly supporting the continuous operation of enterprises. China 's small and medium-sized enterprises are facing severe financial difficulties (Zhang, Cai &

Gao, 2024). The financing difficulties have brought great challenges to the survival of enterprises. The health and vitality of enterprises directly affect the strength of economic resilience (Zhao et al., 2024). The policy of "promoting the integration of science and technology and finance" aims to alleviate the financial difficulties faced by enterprises, ensuring the health and vitality of enterprises by supporting the continuous operation of enterprises, and thus enhancing economic resilience.

The policy of "promoting the integration of science and technology and finance" enhances economic resilience by improving the level of scientific and technological development. Enterprises are the main body of scientific and technological innovation [5]. The transformation of scientific and technological achievements into physical products is an important way to form social and economic benefits (Fang & Sheng, 2020). These economic benefits are important aspects that affect economic resilience (Tan & Hai, 2024, p.88-103). Financing difficulties reduce the transformation speed of scientific and technological achievements of enterprises and affect the development of scientific and technological innovation. Innovation is the key to improving economic resilience (Bristow & Healy, 2018, p.1-20). From the perspective of production efficiency, the high-level science and technology can significantly improve production efficiency and reduce costs (Thatcher & Oliver, 2001, p.17-45), thereby enhancing the viability of enterprises in market fluctuations.

Based on this, this paper proposes H1: the policy of "promoting the integration of science and technology and finance" can improve economic resilience.

H2: The policy of "promoting the integration of science and technology and finance" can improve economic resilience by improving the level of science and technology development.

3.2. The level of financial development plays a regulatory role in policy improvement of economic resilience

The imbalance of financial stagnation would lead to the improvement of the financial system and the maturity of the financial market, which would lead to the different effects of policy implementation. On the one hand, the imperfect financial system would lead to imperfect financial functions. The economic regulation function of finance includes the transmission from policy implementation to the market (Beck, 2012, p.161-203). In the areas with high levels of financial development, due to the perfect economic regulation function of finance, the policy intentions can be more effectively transmitted to the market and promote the effective combination of technology and financial resources. On the other hand, the mature financial markets are usually accompanied by a sound legal and regulatory framework, and laws and regulations are a necessary condition for corporate financing (La et al., 1997, p.1131-1150). With a stable and transparent legal and regulatory environment, it is easier for companies to obtain financing, reduce financing costs, and increase investment willingness,

[5] https://www.stdaily.com/index/yaowen/202407/4bc0e8ae977349cc8184bd5dd1857ba9.shtml

thereby promoting innovation and development. Therefore, the difference in the level of financial development would affect the implementation of policies, which in turn would affect the improvement of economic resilience.

Based on this, this paper puts forward H3: the level of financial development plays a regulatory role in the promotion of economic resilience through the policy of "promoting the integration of science and technology and finance".

4. Model construction and variable description

4.1. Model construction

This paper considers the policy of "promoting the integration of science and technology and finance" as a quasi-natural experiment, and uses the difference-in-difference model to identify the impact of the policy on economic resilience. The specific benchmark model is as follows:

$$Resil_{it} = \alpha_1 + \beta_1 \times did_{it} + \theta_1 \times X_{it} + \omega_i + \varphi_t + \varepsilon_{it} \quad (1)$$

The coefficient β_1 is the focus of this paper, and it reflects the direct impact of the pilot cities of the " Pilot Programme for the Promotion of the Integration of Science, Technology and Finance" policy on the resilience of the local economy. In the model, the subscript i represents the city and t represents the year. $Resil_{it}$ is the economic resilience of city i in year t, representing the explanatory variable. X_{it} are a series of control variables for this article; ω_i is the fixed urban effect; φ_t is the fixed time effect; ε_{it} is a random error term.

4.2. Variable description.

This paper selects economic resilience (Resil) as the explanatory variable, and the implementation of the policy of " promoting the combination of science and technology and finance pilot " (did) as the core explanatory variable, and the level of financial development (FD) as the adjustment variable. The control variables contain per capita GDP (agdp), the ratio of total retail sales of social consumer goods to GDP (retail), the level of agglomeration (density), infrastructure construction (infra), openness (foreign), government behavior (budget). The following are specific variable information:

4.2.1. Dependent variable

Economic Resilience (Resil). Currently, there are two main ways to measure economic resilience in academia. The first is the single index method, and the second is the index system method. This paper uses a single indicator method, based on the causal structure model method of Martin et al. (2016, p.561-585), using the annual national real GDP growth rate as the counterfactual basis for the economic development of each city. The difference between the annual real GDP growth rate of each city and the counterfactual, represents the

local economic resilience. The formula is as follows.

$$\left(\Delta P_i^{t+T}\right)^{expected} = G_N^{t+T}(P_i^t) \quad (2)$$

$$Resil_{i,t+T} = \frac{\left(\Delta P_i^{t+T}\right) - \left(\Delta P_i^{t+T}\right)^{expected}}{\left|\Delta P_i^{t+T}\right|^{expected}} \quad (3)$$

ΔP_i^{t+T} and $\left(\Delta P_i^{t+T}\right)^{expected}$ are the actual and expected changes in GDP of city i in year t+T, respectively; P_i^t is the GDP of city i in year t; G_N^{t+T} is the growth rate of national GDP between t and t+T; $Resil_{i,t+T}$ is the economic resilience of city i from year t to t+T.

4.2.2. Independent variable

In this paper, the dummy variable (did) is used to represent the implementation of the policy of "promoting the integration of science and technology and finance". During the sample period, 42[6] cities in 2011 and 9 cities in 2016 became pilot cities. If a city entered the list of pilot cities in 2011 or 2016, the city 's did value in the year of policy implementation and subsequent years is 1, otherwise the value is 0.

4.2.3. Regulating variables

Financial development level (FD). It is reflected by comparing the total loan and deposit balances provided by financial institutions with the economic output (GDP) of the region. The higher the value, the more developed the financial sector, and vice versa, the more limited the ability to obtain financial resources.

4.2.4. Control variables

This paper introduces a series of other factors that affect economic resilience as control variables, as follows:

Economic development: This paper uses per capita GDP (agdp) and the ratio of total retail sales of social consumer goods to GDP (retail) as economic development indicators to measure economic resilience. Agglomeration level (density): This paper uses population density to measure agglomeration level. Infrastructure construction (infra): The level of infrastructure construction is expressed by the area of real urban roads per capita. Openness (foreign): This paper uses the proportion of foreign capital actually utilized in GDP to measure the degree of openness. Government behavior (budget): This paper uses the ratio of government spending to GDP to reflect government behavior.

[6] The city of Longnan is excluded from this paper due to the high number of missing variables in that city.

This paper selects 276 prefecture-level and above cities in China from 2009 to 2021 as the research object and eliminates the sample of cities with more missing data. The urban resident population data at the end of the year are derived from the statistical yearbooks of various provinces and cities, and the missing data are supplemented by interpolation method. The data of economic and social indicators are mainly derived from the "China Urban Statistical Yearbook (2009-2022)" and the statistical yearbooks of various provinces and cities. Some missing values are collected and supplemented by CEIC, EPS, Wind and other data.

The descriptive statistical analysis of each variable is shown in Table 1.

Table 1 Descriptive statistics

Variable	N	mean	sd	min	max
Resil	3588	17.99	21.36	-11.45	161.40
did	3588	0.14	0.35	0	1
density	3588	0.18	0.12	0	1
agdp	3588	0.01	0.02	0	1
retail	3588	0.38	0.11	0	1
foreign	3588	0.41	0.03	0	0.71
budget	3588	0.07	0.04	0.01	1
infra	3588	0.26	0.02	0	0.44
Tech	3588	0.02	0.02	0	0.21
FD	3588	2.44	1.2	0.59	21.30

5. Results and some discussion

5.1. Benchmark regression and mediation mechanism test

Columns (1) - (4) in Table 2 show the results of the benchmark regression model. In Column (4) of Table 2, the influence factor of the policy "promoting the integration of science and technology and finance" (did) on economic resilience (Resil) is 4.263, and it passes the significance test at the level of 1 %. Columns (1) and (3) are models of unbound time and individual effects, and columns (2) and (4) are models of two-way fixed time and individual effects. Preliminary results in columns (1) and (2) show that the policy of "promoting the integration of science and technology and finance" has improved economic resilience. By adding control variables to the results of columns (3) and (4) to reduce the impact of ignoring control variables, it is found that the policy of "promoting the integration of science and technology and finance" still promotes economic resilience. Therefore, H1 is verified, and this paper can conclude that the policy of "promoting the integration of science and technology and finance" can improve economic resilience.

This paper adopts "Science and technology expenditure accounts for local general public budget expenditure" to measure the level of science and technology (Tech) in the region. Based on Model (1), the second step of mediating effect is constructed. The model is as follows.

$$Tech_{it} = \alpha_2 + \beta_2 \times did_{it} + \theta_2 \times X_{it} + \omega_i + \varphi_t + \varepsilon_{it} \quad (4)$$

This article focuses on the impact coefficient of the policy of "promoting the integration of science and technology and finance" on intermediary variables. If it is significant, it indicates that there is a mediating effect. The variables are consistent with Model (1) and $Tech_{it}$ is the intermediary indicator of this paper.

The results of the intermediary mechanism test are shown in Column (5) of Table 2. The estimated results in Column (5) of Table 2 show that the estimated coefficient of the "promoting the integration of science and technology and finance" policy (did) to the level of science and technology (Tech) is 0.005, passing the significance test at the 1 % level. It is believed that the "promoting the integration of science and technology and finance" policy can improve the level of science and technology. Therefore, it is believed that H2 is established, and the policy of "promoting the integration of science and technology and finance" can significantly increase the investment of public science and technology financial resources and enhance economic resilience by improving the level of science and technology. It is verified that improving the level of science and technology plays an intermediary role in the process of promoting economic resilience in the policy of "promoting the integration of science and technology and finance".

Table2. Benchmark regression

variable	(1) Resil	(2) Resil	(3) Resil	(4) Resil	(5) Tech
did	9.686***	3.845***	10.373***	4.263***	0.005***
	(8.011)	(2.360)	(7.237)	(2.657)	(3.193)
Control	No	No	Yes	Yes	Yes
Year fe	No	Yes	No	Yes	Yes
Id fe	No	Yes	No	Yes	Yes
N	3588	3588	3588	3588	3588
r2_a	0.025	0.801	0.049	0.809	0.745

*Note: *, **, and *** denote significant at the 10%, 5%, and 1% levels, respectively; clustered robust standard errors are in parentheses, as in the table below.*

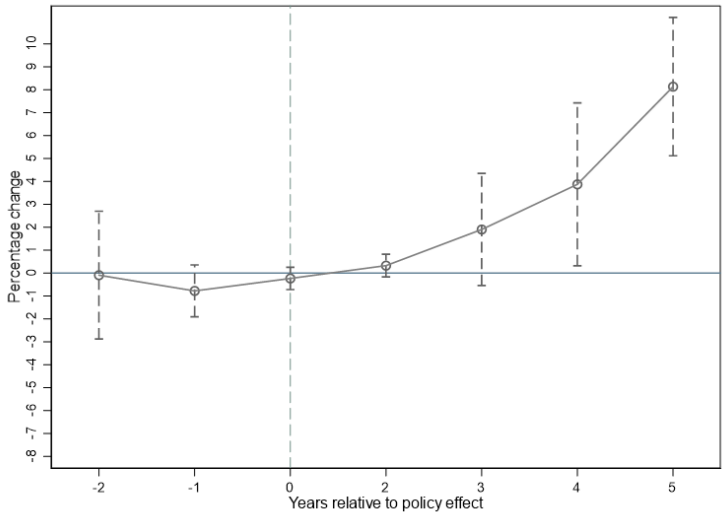
5.2. Robustness test of benchmark regression

5.2.1. Parallel trend chart

To explore the impact of the policy of "promoting the integration of science and technology and

finance" on economic resilience, we should first meet the parallel trend hypothesis. This paper refers to Beck et al. (2010, p.1637-1667) and takes one year after the implementation of the policy as the base period[7]. The regression coefficient and confidence interval are drawn as a parallel trend test chart. It can be seen from Figure 1 that in the years before the policy of "promoting the integration of science and technology and finance", there was no significant difference in economic resilience between pilot cities and non-pilot cities. After the fourth year of the policy, the economic resilience of pilot cities was significantly higher than that of non-pilot cities, and the parallel trend test passed.

Figure 1 Parallel trend test

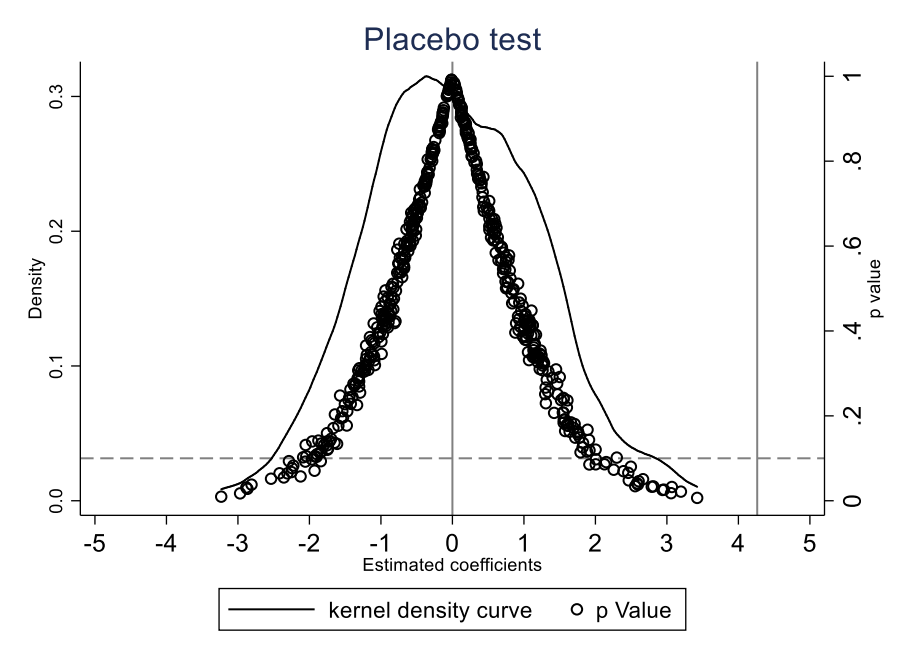


5.2.2. Placebo test

Referring to Cantoni et al. (2017, p.338-392), this paper randomly selects pilot cities to test whether the effect of the policy of "promoting the integration of science and technology and finance" on economic resilience caused by other unobservable factors, in order to further strengthen the credibility of the research results. After randomly selecting 51 cities as the experimental group, the virtual policy variables are constructed to re-estimate the Model (1), and 500 regressions are performed on the extracted data. The regression coefficients are gained, and the kernel density map is depicted as shown in Figure 2. The results show that the benchmark regression coefficient (4.263) is significantly different from the estimated coefficient. The distribution of the estimated coefficient is approximately 0, and the p value is basically greater than 0.1, which to some extent indicates that the benchmark regression conclusion of this paper is not caused by unobserved accidental factors.

[7] The -2, -1, 0, 1, 2... in the figure represent the two years before the policy was implemented, the year before the policy was implemented, the year before the policy was implemented, the first year of the policy was implemented, the second year of the policy was implemented... respectively.

Fugure2. Placebo test



5.2.3. Hysteresis effect

Since the implementation of the policy of "promoting the integration of science and technology and finance" often does not produce the desired results immediately, it has a long-term effect and needs a certain amount of time to observe its impact. In this paper, the regression analysis is carried out after the lag treatment of the policy of "promoting the integration of science and technology and finance". The regression results are shown in Table 3. The impact factors of the policy of "promoting the integration of science and technology and finance" lag 1 year (L.did), 2 years (L2.did) and 3 years (L3.did) on economic resilience (Resil) are 4.702,5.285 and 5.920 respectively. Both passed the significance test at the 1 % level. These shown that there is a lag effect on the impact of the policy of "promoting the integration of science and technology and finance" on economic resilience, and this lag effect increases with time.

Table3.Hysteresis effect result

variable	(1) Resil	(2) Resil	(3) Resil
L.did	4.702***		
	(2.753)		
L2.did		5.285***	
		(3.001)	
L3.did			5.920***
			(3.312)

Control	Yes	Yes	Yes
Year fe	Yes	Yes	Yes
Id fe	Yes	Yes	Yes
N	3312	3036	2760
r2_a	0.805	0.802	0.800

5.3. Heterogeneity analysis

5.3.1. Geographical location differences.

In this paper, different regions are grouped to construct dummy variables in the eastern and non-eastern regions, and dummy variables interact with explanatory variables in the model (1). And regression is performed in groups to further test the difference in the effect of the policy of "promoting the integration of science and technology and finance" on improving economic resilience. In columns (1) and (2) of Table 4, there are significant differences between eastern and non-eastern regions. The regression coefficient of the policy of "promoting the integration of science and technology and finance" in the eastern region to economic resilience is 2.630, which does not pass the significance test. The regression coefficient of the policy of "promoting the integration of science and technology and finance" in non-eastern regions on economic resilience is 5.729, which passes the significance test at the level of 5 %.

It can be found that compared with the eastern region, the non-eastern region has played a greater potential to "promoting the integration of science and technology and finance" policy to enhance economic resilience. The economic development of the eastern region is relatively mature, and the financial and technological industries have a high penetration rate, so the policy effect may be relatively less significant. Further policy development may play a "fine-tuning" role, rather than creating major changes. The problem of financial difficulties in the non-eastern regions is more severe. Therefore, the impact of the policy of "promoting the integration of science and technology and finance" in non-eastern regions on economic resilience is significantly greater than that of the eastern regions.

5.3.2. Political status difference.

Apart from geographical differences, there are also differences in political status of Chinese cities. Firstly, this paper constructs a dummy variable of provincial capitals and non-provincial capitals for cities with different political status, and interacts with the dummy variables with the explanatory variables in model (1) respectively, and groups them for regression to further test the difference in the effect of the policy of " promoting the combination of science and finance " on the improvement of economic resilience. In column (3) and column (4) of Table 4, there are significant differences in policy implementation between provincial capital cities and non-provincial capital cities. In provincial capital cities, the regression coefficient of the policy of "promoting the integration of science and

technology and finance" on economic resilience is 5.286, which passes the significance test at the level of 5 %. In non-provincial capital cities, the regression coefficient of the policy of "promoting the integration of science and technology and finance" on economic resilience is 3.059, which does not pass the significance test.

The reason for this difference may be that compared to ordinary prefecture-level cities, provincial capital cities have inherent advantages in obtaining resources, such as the right to pilot some reform policies, and a higher financial capacity to implement national policies. The impact of "promoting the integration of science and technology and finance" in provincial capital cities on economic resilience is significantly greater than that of the policy of "promoting the integration of science and technology and finance" in non-provincial capital cities on economic resilience.

5.3.3. Education level difference.

Difference in education levels would lead to differences in talents in science and technology development, which would affect policy implementation. In order to test the heterogeneity of the improvement of economic resilience caused by the difference in education level, this paper divides cities into cities with higher education development level and cities with lower education development level according to the "211 Project" university standard, interactings with the explanatory variables in model (1) and making regression respectively. The results show that for cities with higher education levels, the estimated coefficient of economic resilience of "promoting the integration of science and technology and finance" policy is 4.668, and it passes the significance test of 5 % level. For cities with low levels of education, the policy "promoting the integration of science and technology and finance" has an estimated coefficient of 3.059 for economic resilience, which does not pass the significance test.

It shows that in cities with higher levels of educational development, the impact of the policy of "promoting the integration of science and technology and finance" on economic resilience is significantly greater than that of the policy of "promoting the integration of science and technology and finance" at lower levels of educational development. The reason is that the talent generated by cities with higher levels of educational development can more effectively promote the combination of science and technology and finance, and more effectively implement policies.

Table4. Heterogeneity analysis result

variable	(1) Resil	(2) Resil	(3) Resil	(4) Resil	(5) Resil	(6) Resil
interact	2.630	5.729**	5.286**	3.059	4.668**	3.059
	(1.409)	(2.203)	(2.027)	(1.641)	(2.263)	(1.641)
Control	Yes	Yes	Yes	Yes	Yes	Yes

Year fe	Yes	Yes	Yes	Yes	Yes	Yes
Id fe	Yes	Yes	Yes	Yes	Yes	Yes
N	3588	3588	3588	3588	3588	3588
r2_a	0.809	0.809	0.809	0.809	0.809	0.809

5.4. Moderating effect

From the perspective of the level of financial development, this paper examined whether there are significant differences in the effect of the policy of "promoting the integration of science and technology and finance" under different levels of financial development. Based on the idea of the moderating effect model, this paper adds the adjustment variable of the level of financial development (FD) to interact on the basis of model (1), exploring the effect of policy implementation under different levels of financial development. The model is as follows.

$$Resil_{it} = \alpha_2 + \beta_2 \times did_{it} + \beta_3 \times FD_{it} + \beta_4 \times did_{it} \times FD_{it} + \theta_2 \times X_{it} + \omega_i + \varphi_t + \varepsilon_{it} \quad (5)$$

The test results of the adjustment mechanism of the policy of "promoting the integration of science and technology and finance" to enhance economic resilience are detailed in Table 5. In benchmark regression, the impact of "promoting the integration of science and technology and finance" policy on economic resilience is positive. From column (1) of Table 5, it is found that the coefficient (did * FD) of the interaction term between "promoting the integration of science and technology and finance" policy and the level of financial development is 3.893, and the significance test at the level of 1 % is passed. It can be seen that the level of financial development plays a positive role in regulating the impact of "promoting the integration of science and technology and finance" policy on economic resilience. In regions with high levels of financial development, the maturity of financial markets helps to allocate resources more efficiently, guide funds to the most promising technology projects, create a good environment for enterprises, promote cooperation between financial institutions and technology enterprises, accelerate the transformation of scientific and technological achievements, and then enhance economic resilience. It was found that the regulatory effect was significant. Therefore, it is believed that differences in the level of financial development would lead to differences in policies to enhance economic resilience.

In this paper, other robustness tests are used to further verify the credibility of the adjustment effect results to confirm the above conclusions.

1.Excluding extreme values. In regression, extreme values may affect the evaluation conclusion of this paper. In order to eliminate the influence of extreme values on empirical results, this paper deals with the explanatory variables by 1 % tail reduction method, and then performs regression again. The regression results are shown in the column (2) of Table 5. It can be

found that the estimated coefficient of the interaction between the level of financial development and the policy of "promoting the integration of science and technology and finance" on economic resilience is 2.350, which passes the significance test of 1 % level.

2. Shorten the sample period. Since 2020, the outbreak and continued spread of the novel coronavirus have had a significant impact on economic resilience. Therefore, in order to eliminate the bias caused by the COVID-19 epidemic on the regression results, this paper shortens the sample period to 2019 and re-does the regression test. The regression results are shown in column (3) of Table 5. It can be seen from the Table 5 that after excluding 2020 and 2021, the estimated coefficient of the interaction between the level of financial development and the policy of "promoting the integration of science and technology and finance" on economic resilience is 4.112, which passes the significance test of 10 %.

3.Excluding municipalities. This paper considers that municipalities would have a strong specialty in both financial development and urban economic resilience due to their rapid development. Therefore, this paper would conduct regression test again after excluding municipalities in the research sample. The regression results are shown in Column (4) of Table 5. It can be found that after excluding the sample of municipalities, the estimated coefficient of the policy of "promoting the integration of science and technology and finance" on economic resilience is 4.308, and it has passed the significance test at the 1 % level.

Therefore, through the above robustness, this paper believes that the conclusion of the different financial development level would lead to the difference in policy to enhance economic resilience is robust.

Table5. Moderating effect result

variable	(1) Resil	(2) Resil	(3) Resil	(4) Resil
did	-8.731***	-8.360**	-2.258	-10.376***
	(-2.288)	(-2.299)	(-0.948)	(-2.675)
FD	-5.955***	-5.671***	-3.198***	-6.012***
	(-3.400)	(-3.429)	(-3.139)	(-3.368)
did*FD	3.893***	3.737***	1.467*	4.531***
	(3.298)	(3.327)	(1.903)	(3.662)
Control	Yes	Yes	Yes	Yes
Year fe	Yes	Yes	Yes	Yes
Id fe	Yes	Yes	Yes	Yes
N	3588	3588	3036	3536
r2_a	0.831	0.849	0.831	0.832

6. Conclusions and policy recommendations

Based on panel data of 276 prefecture-level cities from 2009 to 2021, this paper considers the pilot policy of promoting the combination of science and technology and finance as a quasi-natural experiment to verify that the level of financial development can affect the implementation effect of the pilot policy of promoting the combination of science and technology and finance, and then affect the improvement of economic resilience. The results show that the implementation of the policy of "promoting the integration of science and technology and finance" has significantly improved local economic resilience. Heterogeneity analysis shows that the policy is heterogeneous in improving economic resilience in the regions with different geographical locations, different political status and different levels of education. In areas with high levels of financial development, the policy of "promoting the integration of science and technology and finance" has a stronger effect on economic resilience. In areas with weak levels of financial development, the policy of " promoting the combination of science and technology and finance " has a weaker effect on economic resilience, but it still promotes economic resilience. Differences in levels of financial development affect the effect of policy implementation.

These research findings can provide reference for different cities to enhance economic resilience with the help of the policy of "promoting the integration of science and technology and finance". The following policy implications are as follows: First, the policy of "promoting the integration of science and technology and finance" should be carried out according to local conditions. In areas with low levels of financial development, the priority should be given to the development of the basic financial industry. After basic financial services have matured, a combination of finance and technology should be proposed. Second, the government should strengthen personnel training. In order to promote the deep integration of technology and finance, we must pay attention to the cultivation and introduction of talents. The fields of finance and science and technology needs talent with interdisciplinary knowledge. By constructing a diversified talent training system, it provides human support for the combination of science and technology and finance.

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INTERNATIONAL FINANCIAL INSTITUTIONS AS CROSS POINT OF SEVERAL THEORIES

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Abstract: *The main objective of this report is to identify theories applicable to international financial institutions. In an environment of revolving crises of varying nature, they continue to adapt to events and develop responses on an urgent basis. The intersections between them are found and an independent theory is identified, which defines their essence for their already over 80 years of unusual activity.*

Keywords: *International financial institutions, Political economy, theories*

JEL: *P00, F00, G20*

Introduction

In order to explore the nature of international financial institutions, the starting point is the widely used concept in the literature of international financial architecture, which refers to the framework of institutions, rules, regulations, agreements and practices that govern international financial transactions and the interaction between states and global financial markets. It covers diverse aspects, including global monetary systems, exchange rate mechanisms, financial regulations, international financial institutions, cross-border capital flows, debt management and crisis prevention and resolution mechanisms.

The year 1945 or the end of the Second World War is considered to be the beginning of the use of this definition (UN, 2023). Before it was named financial architecture, the term international monetary system was used to summarize the global financial system (Goldstein, 2002).

The establishment of the IMF and the International Bank for Reconstruction and Development is a historic moment in the international economic and financial relations for several reasons. With their creation, the previously known international monetary system was fundamentally changed. They contribute to the shaping of the global financial architecture, built by the public and private sector, and they contribute through the extraordinary resource at their

disposal and the political mandate for development (development mandate) of international economic and commercial relations. It is important to understand their existence from different perspectives in relation to their long-standing unusual role in the financial architecture. They have a variety of tools according to the environment in which they operate and have developed managerial, technical, financial and scientific capacity.

Theoretical foundations

The purpose of this paper is to define the economic and political theories relevant to IFIs and to find the intersection between them. They are considered according to the following selection criteria:

First of all, their emergence is a precedent - historically, they have no analogue as a type of institution, as a form of activity and as a financial intermediary. By their nature, they combine qualities and functions of well-known financial and government organizations and institutions, but go beyond the known through their mandate for recovery and development. **Secondly**, from an institutional point of view, they are the subject of research, since they are institutions and this theory largely determines their form of action in relation to the functions they perform. They create a supranational institutional and legal framework that legalizes their establishment. Thirdly, their sphere of action, geographical unlimitedness and promotion of international economic cooperations, as a result of which they contribute to globalization in its modern form, are a precedent. They operate in territories of developing countries that are in dire need of financial, regulatory and managerial resources and foreign investment. They grant loans in sectors that are high-risk and conventional bank financing is unprofitable or has no return (financing against reforms). They create the conditions for and are themselves the engine of globalization through the policies of the Washington Consensus. In the fourth place, they are also the subject of research from the theory of development, on the basis of which they stand, but at the same time they develop. In fifth place is their form of action and management - they are strictly financial institutions, which are also considered by international finance and banking theory. They allocate resources to both the public and private sectors. Each member state has representatives who are part of the political and national banking system. Each country has the right to vote according to the amount of its shareholding in the capital of the respective

development bank. Rating agencies evaluate their activity according to strictly defined criteria with a credit rating.

The adopted approach is from the aspects listed so far, in order to gain a broader idea of their nature and place in the modern economy. They combine the dual nature of development agencies and financial institutions (Bobeva, 2018), which operate in the conditions of a changing macroeconomic environment. The analysis of the theories determines the contribution of each of them to their conceptualization. Special attention is paid to the World Bank and the International Monetary Fund as prototypes of IFIs and a starting point for the formation of new supranational financial institutions.

In the theory of them, several approaches are applied (Sanford, 1975) - project, macroeconomic and socially oriented. Proponents of the first approach believe that IFIs should apply the method of expanding output and promoting development in order to direct financing to efficient investments and institutions. This approach ensures that the funds will be used for exactly the purposes defined in the project and monitoring of its effect on development can take place. Among the macroeconomic theories of development, the development quality approach, applied mainly by the World Bank, stands out, according to which the goals of sustainable development must be followed. From the social perspective of income distribution theories, IFIs are expected to help reduce poverty and ensure equity in income distribution.

Institutional theories

Institutional theory has been identified as providing a definition of the parameters of IFIs. The literature review on it observes how institutional isomorphism conditions the creation of new IFIs. Although countries initially found an answer to their needs in the establishment of new institutions, in practice they tended to become more similar over time. The resource dependence theory fully suits the financial institutions under consideration, as they must meet the expectations of the member states. However, IFIs are not limited in meaning and functions to it alone. The theory of both approaches, and more specifically rationalist institutionalism, overlaps with the political nature of international development banks to provide cooperation between interested states, while reflexive institutionalism emphasizes the ways in which institutions can shape state preferences and identities to promote long-term stability and cooperation in international relations.

Crises theories

Next among the applicable theories of IFIs is that of crises. Created precisely after the greatest economic and military crisis in the 20th century, namely the Great Depression and the two World Wars, their role in the financial architecture is determined by the need to provide resources in various forms to countries to overcome economic and social inequalities and challenges.

There is a strong link between the activities of international financial institutions and crisis management. After the fulfillment of their initial mission, IFIs enter the role of stabilization policy generator, developing specific programs and policies for developing countries. They take on a new mission to build their capacity and make efforts in the scientific research field to predict the emergence of crises. Development banks are an interesting subject of research because they have an important role, given the resources at their disposal, in helping affected countries recover from a crisis. The abundance of specific crises over the past decade has put IFIs to the test after their failure to anticipate the global financial crisis dealt a major blow to their reputation as institutions of high macroeconomic and forecasting expertise.

Bank theories

Banking theories have several points of intersection with IFIs, but at the same time differ from traditional banking institutions. Their capital structure is different in that they raise their capital from member states and do not pay interest or dividends on it. The focus of IFIs is to achieve the mandate through the granted loans, while simultaneously observing the solvency of the borrowers and the return on the loan, but not profit maximization. The project approval procedure is much longer than with commercial banks. They grant loans, but in sectors and for projects of high social and environmental importance, in priority economic and social sectors, respecting the principle of complementarity of financing and non-competition with commercial banks.

In the theory of IFIs, those of development, of institutions, of the banking and financial sector, of crises and of globalization simultaneously intersect. The activity and role of these institutions is determined by the various theoretical directions, but they are not exhaustive in order to fully define the nature and essence of development banks. They are part of each of

them, combining their philosophy and principles, but also transcending them with their specific mandates.

Their role has long exceeded its original format and given the potential they develop and the importance of the financial and managerial resources at their disposal, they are permanently positioned in the international financial architecture. They are an invariable part of the modern financial and political environment, which is supported by the political will of the countries that participate in them.

Globalization and deglobalization theories

The contribution of international financial institutions to the removal of trade barriers, the liberalization of markets, the promotion of international cooperation and the implementation of neoliberal policies greatly stimulates the processes of modern globalization and is its driving force. The effect of the First and Second World Wars on global relations, trade and economics and the ideological alliances outlined was significant, including the period after the end of the Second World War when, with the creation and development of the Bretton Woods Institutions, processes of globalization developed and expanded.

The negative effects of the activities of international corporations also cast a shadow on the activities of development banks, which are associated with increasingly interconnected economies. Public scandals involving multinational companies such as Enron discredit multinationalism and foreign direct investment, the main catalyst of which is development banks.

The World Bank and IMF were demonized for the policies they "forced" developing countries to adopt in the 1980s and 1990s in South America, Africa and Asia. Their activities have given rise to serious anti-globalist demonstrations during their meetings. Development banks and international corporations become the collective image of all the negative effects of globalization. The protests and anti-globalization movements of the 1990s criticized the activities of these institutions, but did not oppose the process of globalization itself.

There is no single and overarching theory of deglobalization, with political expansion outpacing theory. The global financial crisis of 2007-2008 contributed to the deglobalization trend by promoting actions to stimulate local production and local consumption, pursuing protectionist policies, and directing countries' attention to self-dealing with economic

challenges and crises. States are driven by the desire to prevent the transmission of global economic imbalances to the regional level.

The deglobalization debate continues as examples of policies aimed at limiting globalization proliferate. It is unusual that it is the international financial institutions, as the main driver of globalization, that support policies such as the global minimum tax of 15% on the activities of multinational companies with revenues of more than 750 million euros. Its introduction was ratified by 135 countries in 2021 and will enter into force in 2024 (OECD, 2024). Another signal that the world is moving towards deglobalization is that a huge number of countries, especially those that have been extremely liberal (US, Canada, EU), are introducing the so-called screening of foreign direct investment (European Commission, 2020). The aim of the EU regulation, introduced in 2020, is for the Union to be well prepared to identify, assess and mitigate potential risks to security or public order, while at the same time continuing to be among the most open investment areas in the world. This measure remains a restriction on investment from third countries due to national security concerns.

More examples of acts of deglobalization are at least 210 public actions taken to limit social and trade relations with China during Donald Trump's tenure. These include tariff and non-tariff measures, restrictive actions such as the visa regime, diplomatic actions, measures by the Ministry of Defense to ensure freedom of navigation and transit through the Taiwan Strait, blocking the import of articles produced through forced labor, including designating China as an adversary.

Such measures have not been taken only by the Trump administration and only with regard to China. Recent years have seen significant dynamics in trade tariffs imposed on trade in steel, aluminum and other goods between the US, Canada, Turkey, the European Union, Russia and Japan. The Biden administration is imposing various tariffs on steel and aluminum imports with respect to Canada in 2020, on aircraft trade with the European Union that will not be suspended until 2021, and a number of other restrictions on the free movement of capital. which are imposed through international trade relations. In fact, the donor countries advocate a liberal policy in international relations, but they themselves impose a number of highly restrictive measures.

Development theories

Development theories are closely related to the essence of IFIs, given their pursuit of the concept of economic development, which refers to the process of improving the welfare of countries.

They aim to explain the causes of poverty, inequality and backwardness in the development of some countries, trying to find universal and specific formulas for achieving sustainable and equitable development. The beginnings of research can be traced back to the post-World War II period, when the process of decolonization was underway and the newly independent countries sought to achieve economic prosperity and modernization (Rapley, 2007). Schumpeter's theory also made a significant contribution, preceding this period. The need to assimilate the causes of backwardness and to identify applicable strategies to promote economic growth and social progress provoked extensive research resulting in a range of approaches.

Some of the popular development theories include modernization theory, dependency theory, creative destruction theory, human development theory, neoliberalism and post-development theory. They reflect different historical moments and ideological contexts, being enriched by the emergence of new challenges and perspectives. Each has its own assumptions, strengths and limitations and provides a different framework for understanding and policy development.

Conclusions

Several conclusions emerge from the historical review of the economic and political context in which IFIs were created and operate. They are institutions with the primary objective of sustainable development and economic prosperity by promoting international cooperation and the free movement of goods and capital. Despite the political influence exerted on them, they continue to operate as financial institutions and occupy a specific place in the international financial architecture, guided by good banking practices for risk assessment and management.

Throughout the period of activity, they are an important political and financial tool in the allocation of resources in the pursuit of economic prosperity and in the realization of modern global goals such as sustainable development through initiatives for the inclusion of the private sector, providing technical assistance in the transition from a planned to a market economy, poverty reduction by promoting vulnerable groups and women's entrepreneurship, combating

climate change, developing medicine and a number of other sectors recognized by IFIs as key ones.

Capitalize on their experience, knowledge and skills to carry out their mandates. One of the challenges facing IFIs is how the neoliberal theory of public spending restraint fits into the generous financial instruments during the COVID-19 pandemic that institutions are providing. An interesting phenomenon is how they manage to adapt more and more quickly to the type of crises and finance to a greater or lesser extent the public and private sectors.

There is a change in the neoliberal paradigm, which they applied most prominently in the early 1980s and 1990s. The global financial crisis of 2007-2008 is the moment that clearly reports the degree of globalization. IFIs are the engine in realizing the ideas, goals and theory for it and are one of its main tools. According to the degree of openness of the economy and susceptibility to external shocks, countries are affected to varying degrees. During the crisis, it turns out that advanced economies fail, but have sufficient mechanisms to counteract its consequences, while for developing countries it deepens the dependence on foreign aid.

The recent history of IFIs has seen a reverse wave towards deglobalization and the implementation of more and more policies and actions in the implementation of their projects. In an environment of revolving crises, the Bretton Woods institutions, dominated by the neoliberal paradigm, become a catalyst for sustainable development, adopting the 17 Goals for sustainable development, stimulating small and medium-sized enterprises, agriculture, green energy, gender equality, combating climate changes and a number of others.

At the global level, there is an erosion of the policy of free movement of goods and capital. It is increasingly limited by the introduction of a number of tariff and non-tariff restrictions in the US, Europe and Asia, expressed in a global tax on the activities of multinational companies, trade sanctions on trade with Russia and other countries, the introduction of trade tariffs on trade with certain goods between the US, Canada, the EU, Japan and Turkey, for example.

The events of deglobalization outpace the theory of it. At the same time, IFIs are also changing the focus of their activity. They are becoming much "greener" in their policies based on the Paris Agreement and combining regional realities with international technologies in implementing projects for regional sustainable development.

International financial institutions face new challenges to maintain their political neutrality in the face of the war in Ukraine. There was a clear division and strong opposition to the war by the World Bank Group, the European Bank for Reconstruction and Development, and to a lesser extent the regional Black Sea, Asian and African banks. On the other hand, the New Development Bank does not even mention Russia's invasion of Ukraine in its annual reports.

An exceptional dynamic is observed in the activity of international financial institutions. They manage to stick to financing infrastructure projects in developing countries to build transport arteries, provide access to drinking water and health care, and at the same time provide a response to political, economic, social and health crises and disaster situations due to hurricanes, earthquakes and other natural disasters.

After the review of the various theories related to IFIs, an intersection between each of them and the activities of development banks, which are part of the creators of global policies, is outlined. Each of the examined theories covers a part of their mission, but is insufficient to explain the essence, the role and the place they distinguish with their presence in the international financial, social and economic arena.

The institutional framework at the global level, the development policies that they implement through good banking practices in conditions of revolving crises and the contribution to globalization determine to the greatest extent the modern theory of their activity. By developing a research arsenal and their contribution to the research fields, they show that they adapt to the events and remain an up-to-date institutional format of financial institutions that is applicable to the dynamic environment of operations. Their apolitical essence is revealed with the position they take on the war in Ukraine. Member states are leaving institutions that are dominated by Russia, such as the International Monetary Fund, and the existence of the Black Sea Bank remains in question. Efforts are being made to provide additional capital to finance projects in priority industries and the green transition. They are responsible to the member states for achieving the goals set in the annual reports.

Contemporary IFIs theory is the intersection of theories of institutions, crises, banks, development, and globalization and deglobalization, summarizing the reasons for the role they play in the modern financial architecture. If in 1944 their actions were on a two-dimensional

surface, then in 2024 they are enriched and represent a multidimensional prism with different dimensions. They respond with equal commitment to diverse crises and model the course of events with their presence. They continue to be a sought-after voluntary tool for implementing global policies.

At the same time, the nature of development banks is a precedent, and each of the examined theories can explain only a part of their nature, but contributes to broadening the understanding of their role in the modern financial architecture.

The analysis of the historical context and the neoliberal paradigm are the starting point for explaining the nature of development banks, and on this basis the changes are identified - from the pillars of globalization, they come out of the identity of the Washington Consensus and there is reason to talk about a new paradigm of IFIs.

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THE DIGITAL EURO: A CATALYST FOR ECONOMIC RECOVERY AND DIGITAL TRANSFORMATION IN THE POST-CRISIS PERIOD

Antonina Toncheva

Abstract:

This paper examines the subject of the digital euro as a central bank digital currency (CBDC) and its role in reshaping the Eurozone's economic and financial ecosystem. The primary object is to evaluate its impact on monetary policy, financial inclusion, and the functionality of traditional banking institutions. The paper's thesis asserts that the digital euro has the potential to enhance monetary control and accessibility while simultaneously challenging traditional banking structures. By analyzing statistical data, including a reduction of unbanked populations in the Eurozone and potential GDP growth linked to financial inclusion, the paper demonstrates how the digital euro can improve economic efficiency. Furthermore, it highlights risks for banks, such as reduced deposit holdings, and offers solutions like public-private partnerships to mitigate disruptions. These findings underscore the transformative yet challenging nature of implementing a digital euro.

Keywords:

Digital euro, Central Bank Digital Currency (CBDC), European Central Bank (ECB), monetary policy, financial inclusion, digital transformation, economic stability, payment systems, privacy, cybersecurity, and Eurozone recovery.

JEL: *E52, E58, E42, G21*

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1. Introduction

The emerging Central Bank Digital Currencies (CBDCs) are transforming global finance induced by fast and furious digitalization, ever-changing monetary needs, and challenges arising from economic crises. As digital forms of traditional currencies, CBDCs will open new avenues for central banks to enhance further monetary policy effectiveness, financial inclusion, and economic resilience. In times when most countries around the world are considering their options for CBDC issuance with a view to the modernization of their payment systems, moving away from cash dependency, and addressing cross-border payment inefficiencies, a digital euro would be a proactive step by the ECB in the direction of monetary sovereignty, economic recovery, and digital transformation within the Eurozone.

The importance of CBDCs extends beyond mere digitization. CBDCs would be seen as part of devices that will increase the recovery of economies from crises that destroy industries and heighten socio-economic inequalities, such as the COVID-19 pandemic. They provide a secure, programmable currency that could improve targeted stimulus distribution, reduce transaction costs, and on-board unbanked populations into the financial ecosystem. More broadly, for the Eurozone, it is part of broader objectives: strengthening the global role of the euro, reinforcing financial stability, and promoting innovation in the means of payment, especially with the growing competition from cryptocurrencies and private digital means of payment.

The digital euro is more than a currency; it is a policy tool fully part of post-crisis economic policy strategies. It complements fiscal measures with the hope of sustainable recovery in overcoming structural challenges like unequal access to finance. The digital euro can protect the integrity of the financial system within the Eurozone by offering a sound legal alternative against decentralized digital currencies.

Through this complete analysis, the digital euro emerges as the key factor and lever of economic renewal and digitalization to face the challenges of the post-crisis Eurozone, remaining on track amid the steadily growing role of the digital economy in the modern world.

2. Concept and Development of the Digital Euro

The digital euro is an essential innovation in the framework of currency and monetary policy of the European Central Bank. The digital euro is a subcategory of Central Bank Digital Currency that envisions the integration of digital forms of cash that are as safe, efficient, and inclusive as traditional physical cash for every citizen and company within the Eurozone (Klein et al., 2020).

2.1 Motivations for Developing the Digital Euro

The European Central Bank (ECB) has introduced the development of the digital euro with several key motivations that reflect its strategic goals and the changing needs of the financial ecosystem in the Eurozone. In this view, one of the main reasons is to increase the population's access to some form of digital payment system that will improve access for those currently unbanked or underbanked (Brunnermeier & Landau, 2023). This would be considered bridging the gap for marginalized populations and increasing participation in the formal economy. According to the ECB, access to digital financial services would increase significantly with the introduction of the digital euro, promoting inclusivity across the Eurozone (European Central Bank, 2023).

Another strong motivation towards the digital euro is that this currency will make payments cheaper for both the consumer and the business side. A cost-free and efficient way to pay will be streamlined, with less dependency on an intermediary that decreases cost and complexity. Such economies in the price and factors of complexity are expected to provide high economic benefits and support more dynamic and competitive financial markets (European Central Bank, 2023).

Another reason the ECB is developing a digital euro is the need to preserve monetary sovereignty. The ECB also perceives the increasing power of private digital currencies and foreign CBDCs, which may undermine the euro's footing and soundness. A public digital currency will further bolster confidence in the monetary system, making the euro the core of the Eurozone's economic structure (Grünewald et al., 2021).

Lastly, the digital euro is aligned with more general trends in digital transformation. Developing the digital euro supports the modernization of payment infrastructure, responding to changing consumer and business demands for digital payment solutions. This aspect further underlines that the ECB is committed to promoting innovation while, at the same time, supporting competitiveness in a fully digitized global economy (European Central Bank, 2023). In addressing these multiform objectives, the digital euro is transformed into a strategic instrument for taking on challenges and raging opportunities representative of the 21st-century financial landscape.

2.2 Technological Aspects: Blockchain vs. Centralized Ledger

The technological backbone of the digital euro is thus an intrinsic part of its development, as it preordains the efficiency and security of the currency-including the integration within existing financial systems. The ECB considered several technological solutions and has focused its work

to a great extent on two feasible architectures: blockchain-based systems and systems with centralized ledgers (Tronnier et al., 2022). Blockchain technology allows transactions to be recorded across a distributed network in a decentralized ledger system. This decentralized approach enhances transparency and security, making the system less vulnerable to cyberattacks. However, blockchain technology also poses significant challenges, particularly concerning scalability and energy efficiency, which could hinder its widespread adoption in high-volume payment systems (European Central Bank, 2023).

Whereas with a central ledger architecture, the transaction ledger is held centrally by the operator/authority, such as the ECB, in a decentralized architecture, this is not the case. This may offer more significant throughput with smoother integration into the current financial infrastructure. Table 1 gives a brief comparison of both. While these systems are efficient and more accessible, they risk some downsides- a single point of failure and compromise on intrinsic transparency (Cunha et al., 2021).

Recognizing the strengths and weaknesses of both models, the ECB has preferred a hybrid approach. Such design purportedly combines the security and transparency of blockchain technology with the efficiency and centralized control of traditional systems, aiming to balance innovation with practical considerations (European Central Bank, 2023).

Table 1: Comparison of Blockchain and Centralized Ledger Architectures

Aspect	Blockchain-Based Architecture	Centralized Architecture
Decentralization	High	Low
Scalability	Moderate	High
Energy Efficiency	Lower	Higher
Control	Distributed	Centralized
Transparency	High	Moderate

Source: ECB Technical Analysis

3. Economic Impact

The emergence of the digital euro will bring revolutionary changes in the economic environment of the Eurozone when it comes to implementing monetary policy, including financial inclusion and aggregative economic gains.

3.1 Impact on Monetary Policy

The digital euro is one avenue through which the central bank, for instance, the European Central Bank, could implement monetary policy in an advanced way and observe it. Among other apparent advantages, there is much better control over liquidity. This would contrast with traditional monetary policy, where liquidity might not necessarily be affected, perhaps only indirectly through interest rates (Bhaskar et al., 2022). Under a digital currency regime, the money supply is directly controlled through framing rules about its issuance and circulation. This direct regulation facilitates quicker intervention in periods of economic fluctuation.

Another key benefit of the digital euro is the benefit it would confer by enhancing monetary policy operational and analytical instruments within the Euro area's central bank. First is better control over liquidity. Conventional monetary policy cannot directly influence economic liquidity except by setting interest rates (Minesso et al., 2022). Under digital currency, it is different in that the money supply can be controlled directly with guidelines over issuing and circulating digital currency. This immediate control also permits more exact interventions in periods of economic change. Another substantial positive effect of real-time data involves how the structure of the digital euro immediately reports to the ECB, which explains variations in the dynamics of spending habits, the velocity of money, and other essential measures. Real-time insight creates the conditions for making timely and informed policy decisions to keep monetary interventions responsive and effective (Bindseil et al., 2021).

The digital euro could also improve the efficiency of monetary policy transmission. Since it would allow households direct access from the central bank, it reduces dependence on any intermediary, which can gradually slice the costs and delays associated with using the tool. This efficiency is needed more during a troubled economic period when policies need timely actions (Barrdear & Kumhof, 2022). The digital euro will give instant information to the ECB concerning transactions, which can help economists understand spending habits better, the velocity of money, and other necessary measures of economic performance. In return, real-time insight allows for timely, informed policy decisions that will make monetary interventions responsive and effective (Barrdear & Kumhof, 2022).

3.2 Enhanced Financial Inclusion

In the Eurozone, financial inclusion still needs to be solved. As illustrated in Table 2, The World Bank Global Findex Database highlights a significant decline in unbanked adults across EU Member States between 2017 and 2021, from 30.9 million (8.2%) to 13.5 million (3.54%). This progress underscores the effectiveness of financial inclusion initiatives, yet disparities persist, with countries like Romania (30.88%) and Bulgaria (16.03%) maintaining higher unbanked populations. The digital euro could address these gaps by promoting accessible and inclusive financial services across the Eurozone (World Bank, 2024).

The digital euro can significantly reduce this figure by offering an inexpensive, user-friendly platform for financial transactions. Those who cannot afford bank accounts will find access to the digital euro through a digital wallet, integrating them into the formal economy. This inclusion benefits the people and enhances general economic activity by increasing the number of consumers (Wang et al., 2022). Besides that, the digital euro will also enable cross-border transactions across the Eurozone by reducing barriers to people and businesses in different member states. The ease of transaction this will offer will boost economic integration and help the objectives of the single market.

Table 2: Financial inclusion in EU Member States, unbanked adults

	2017		2021	
Country	**Unbanked adults 15+**	**Relative share**	**Unbanked adults 15+**	**Relative share**
Austria	**137.700**	**1,84%**	**3.761**	**0,05%**
Belgium	**128.041**	**1,36%**	**95.329**	**0,99%**
Bulgaria	**1.697.604**	**27,80%**	**947.642**	**16,03%**
Croatia	**494.946**	**13,86%**	**283.466**	**8,20%**
Cyprus	**109.767**	**11,28%**	**69.197**	**6,87%**
Czech Republic	**1.703.016**	**19,01%**	**456.366**	**5,06%**
Denmark	**3.947**	**0,08%**	**0**	**0,00%**
Estonia	**22.137**	**2,01%**	**6.929**	**0,62%**
Finland	**9.866**	**0,21%**	**21.861**	**0,47%**
France	**3.270.789**	**6,00%**	**419.374**	**0,76%**
Germany	**613.053**	**0,86%**	**16.765**	**0,02%**
Greece	**1.341.302**	**14,53%**	**473.335**	**5,12%**
Hungary	**2.105.537**	**25,06%**	**983.136**	**11,78%**
Ireland	**173.372**	**4,66%**	**13.310**	**0,34%**
Italy	**3.255.366**	**6,21%**	**1.401.949**	**2,71%**
Latvia	**112.583**	**6,78%**	**53.731**	**3,38%**
Lithuania	**419.049**	**17,12%**	**152.777**	**6,47%**
Malta	**10.302**	**2,64%**	**15.982**	**3,55%**

Netherlands	**51.485**	**0,36%**	**39.231**	**0,27%**
Poland	**4.292.591**	**13,27%**	**1.377.061**	**4,28%**
Portugal	**681.086**	**7,66%**	**658.625**	**7,35%**
Romania	**7.039.982**	**42,25%**	**5.031.950**	**30,88%**
Slovak Republic	**727.964**	**15,82%**	**201.923**	**4,38%**
Slovenia	**43.408**	**2,47%**	**16.937**	**0,95%**
Spain	**2.474.022**	**6,24%**	**689.696**	**1,70%**
Sweden	**21.133**	**0,26%**	**26.545**	**0,31%**
Totals	**30.940.048**	**8,20%**	**13.456.879**	**3,54%**

Source: World Bank Global Findex Database

3.3 Economic Growth through Increased Financial Service Accessibility

Access to financial services enables people to save and invest and, therefore, become more entrepreneurial, which can be very useful in economic development. Let us now quantify the effect of financial inclusion on GDP growth. According to studies, a 1% rise in financial inclusions results in a 0.03% rise in GDP growth, which implies that if a digital euro decreases the unbanked population by 1% in the Eurozone area, then GDP would increase by approximately 0.03% (World Bank, 2020).

This relationship can be expressed through the following formula:

$$\Delta GDP = \alpha \times \Delta FI \quad (1)$$

Where:

ΔGDP = Change in GDP

α = Coefficient representing the impact of financial inclusion on GDP (0.03)

ΔFI = Change in financial inclusion percentage

If the digital euro improves financial inclusion by 2%, the expected GDP growth would be:

$\Delta GDP = 0.03 \times 2 = 0.06\%$

The digital euro could transform the Eurozone's economic framework through enhanced monetary policy implementation, financial inclusion, and growth. It enables real-time information and direct control over liquidity, entrenching the ECB as a more effective tool for economic management (Burlon et al., 2024). The digital euro can thus bring unbanked populations into the financial system, thereby broadening the scope of economic participation and driving growth. Where the promise of increased GDP may seem incremental, the long-term cumulative effects underscore the strategic importance of making a resilient and inclusive economy capable of moving forward for the digital euro (Burlon et al., 2024).

4. Digital Transformation

The digital euro represents the defining moment in digitizing means of paying in the Eurozone. As one of the central bank's digital currencies, it is poised to shake up old banking systems by offering opportunities and challenges to financial institutions and customers.

The development of the digital euro will, therefore, modernize the whole payment infrastructure in the Eurozone, which should be secure, efficient, and universally accessible. Unlike existing digital payment methods that rely on intermediaries, the digital euro would be a direct liability of the European Central Bank (ECB), ensuring stability and trust. This initiative aligns with the ECB's objective to foster innovation in the payment sector and reduce reliance on non-European payment solutions (Burlon et al., 2024).

One of the main benefits of the digital euro is that it could enable settlements in real-time, directly between peers, without the involvement of any traditional bank intermediary. In this way, the time and cost of transactions can be reduced dramatically, enabling higher efficiency of the payment system. Secondly, the digital euro might allow offline payments, ensuring that payments can always be made without an internet connection, adding resilience to the payment infrastructure (European Central Bank).

In the first half of 2023, card-based payments within the Eurozone surged by 15.6%, totaling 36.5 billion transactions, corresponding to €1.5 trillion. Contactless card payments grew significantly, comprising 69% of all non-remote card payments by volume and 50% by value. Lithuania led in card payments as a percentage of non-cash payments at 78% (European Central Bank, 2023). Credit transfers increased by 10% to 14.6 billion, making up 93% of the total value of non-cash payments (€103.6 trillion), despite a decline in total value by 5.8%. Latvia had the highest % of credit transfers in non-cash payments at 36%. Direct debits declined by 3.1% to 10.4 billion, but their value rose sharply by 27.1% to €4.8 trillion. Germany accounted for 34%

of all direct debits in non-cash payments (European Central Bank, 2023). E-money payments rose by 6.9% to 4.4 billion transactions, valued at €0.2 trillion, predominantly conducted through e-money accounts (91% of transactions) (Europe. Payment card ownership increased by 4.7%, averaging 1.9 cards per Eurozone inhabitant, while point-of-sale (POS) terminals rose by 13.3% to 19.9 million, 83% contactless-enabled. Conversely, ATMs declined by 3.5% to 260,495, with 24% supporting contactless transactions (European Central Bank, 2023). The introduction of the digital euro is expected to shift these dynamics, potentially increasing the adoption of digital wallets and reducing reliance on cash and card-based payments.

4.1 Risks for Financial Institutions

While the digital euro has many advantages, conventional financial institutions also have drawbacks. Traditional banks' concerns include the possibility of their intermediary role being displaced. As more consumers start using the digital euro in transactions, banks will have fewer deposit holdings, which may affect their lending capacity and profitability (European Central Bank).

Secondly, the digital euro increases competitive pressures in the payment services market. Other market players, such as FinTech companies, might similarly exploit the digital euro to develop state-of-the-art payment services, putting additional pressure on the market positions of traditional banks. Increased competition could also force banks to innovate and change their services to keep customers (Jabbar et al., 2023).

Also, the issuance of municipal bonds represents a critical instrument for local governments to mobilize financial resources for infrastructure development, public service provision, and other strategic initiatives. However, the relative unattractiveness of this financing mechanism in certain jurisdictions raises pertinent questions regarding the institutional capacities and technical expertise of local administrations. Furthermore, the advent of digital currencies, such as the digital euro, introduces new dimensions to the financial landscape. While these innovations offer potential enhancements in efficiency and security, they also necessitate a heightened level of financial literacy and technological proficiency within local governments. The European Central Bank emphasizes that issuing a digital euro is not merely about technological adaptation but also about safeguarding the core principles of the monetary system - stability, trust, and inclusivity - in an era of rapid transformation. (European Central Bank, 2025).

Addressing these deficiencies through targeted policy interventions, financial education programs, and enhanced intergovernmental coordination may prove instrumental in fostering a more robust and dynamic bond market.

4.2 Consumer Benefits

For consumers, the digital euro promises several advantages. Foremost is the potential for faster and more cost-effective payments. By eliminating intermediaries, transactions can be processed instantly, reducing delays associated with traditional banking systems. This efficiency is particularly beneficial for cross-border transactions within the Eurozone, which currently face higher costs and longer processing times (Lee et al., 2021).

Moreover, a digital euro might foster financial inclusion by enabling the population without traditional bank accounts to use digital means of payment. Financial inclusion may mean improved social outcomes for the underserved and greater economic participation. At the forefront of digital transformation in the Eurozone, the digital euro modernizes the payment system with faster and more cost-effective transaction means. However, it also poses several challenges for conventional financial institutions to adapt strategically to maintain a competitive advantage (Grünewald et al., 2021). The ECB should strive to produce a balanced approach that maximizes the benefits of the digital euro for consumers while mitigating risks to financial institutions as further development is made on the digital euro.

Implementing the digital euro introduces significant challenges and risks concerning privacy and cybersecurity. As a Central Bank Digital Currency (CBDC), the digital euro necessitates robust measures to protect user data and ensure the security of transactions. This section explores these challenges, provides case examples of data breaches, and presents formulas to calculate potential costs associated with cybersecurity improvements.

5. Privacy and Cybersecurity Concerns

The digital nature of the digital euro has tremendous privacy issues. Transaction tracing is possible in a way that cash transactions are not as they are anonymous. The ECB considers privacy necessary and maintains that the digital euro should offer the highest privacy levels of all electronic payment options (European Central Bank, 2024). However, striking a balance between private rights and regulatory needs, sometimes coinciding with anti-money laundering requirements and counter-terrorism financing, is another complex challenge.

The second most crucial issue is cybersecurity. The infrastructure of the digital euro may be the future target of cyberattacks, including hacking, fraud, and data breaches. Ensuring the security of the digital euro is paramount to retaining public trust in money and the financial system's stability. The ECB firmly states that various cybersecurity measures are required to protect the digital euro against potential threats (Bindseil et al., 2021).

5.1 Case Examples of Data Breaches

Some potential risks with digital currencies are evident with past data breaches within the financial industry. For instance, Capital One had a breach in 2019 that compromised the personal information of over 100 million customers, including the customer's name, address, and credit score (Secure Frame, 2024). This was due to the improper configuration of a firewall-a stark reminder of how vital cybersecurity measures can be.

Similarly, the 2016 Bangladesh Bank heist saw cybercriminals manipulate weaknesses in the SWIFT payment system to steal $81 million. The heist showed the potential for sophisticated cyberattacks against financial institutions and the need for constant monitoring and enhancements of security (Nabilou, 2020). Such cases depict potentially vulnerable situations that could hit the digital euro unless proper cybersecurity is implemented.

5.2 Calculating Potential Costs of Cybersecurity Improvements

Investing in cybersecurity is essential to mitigate risks associated with the digital euro. Organizations can use various formulas to estimate cybersecurity investments' potential costs and benefits.

One common approach is the Return on Security Investment (ROSI) formula:

$$\text{ROSI} = (\text{Risk Reduction} \times \text{Asset Value}) - \text{Cost of Security Investment} \quad (2)$$

Where:

- Risk Reduction represents the percentage decrease in risk due to the security investment.
- Asset Value is the total value of the assets being protected.
- The cost of Security Investment is the total cost of implementing the security measure.

For example, if a security investment reduces the risk of a data breach by 30%, protects assets valued at €100 million, and costs €2 million to implement, the ROSI would be:

ROSI = (0.30 × €100,000,000) - €2,000,000 = €28,000,000

This positive ROSI indicates that the investment is financially beneficial.

Another useful metric is the Annualized Loss Expectancy (ALE), which estimates the expected annual financial loss due to a specific risk:

$$ALE = \text{Single Loss Expectancy} \times \text{Annual Rate of Occurrence} \quad (3)$$

Where:

- SLE is the monetary loss expected from a single occurrence of the risk.
- ARO is the estimated frequency of the risk occurring within a year.

For instance, if a data breach is expected to result in a €5 million loss per incident (SLE) and is estimated to occur once every five years (ARO = 0.2), the ALE would be:

ALE = €5,000,000 × 0.2 = €1,000,000

This will help the organization understand what is usually expected in monetary values from a particular cybersecurity risk every year. The digital euro's introduction and implementation represent critical points of privacy and cybersecurity challenges. The key findings from different data breaches within the financial industry have highlighted the requirement for solid security measures. Formulas such as ROSI and ALE can also be extended to quantify costs and benefits related to investments in cybersecurity, making the digital euro secure and trustworthy for users.

5.3 Policy Implications and Recommendations

The digital euro simultaneously opens up opportunities and challenges and demands robust policy frameworks to counterbalance the associated risks and assure equity in digital access. An address may include risk management examples through regulatory sandboxes and inclusive digital policies to favor general access to the digital euro's benefits.

Establishing a regulatory sandbox is one way to manage these risks by allowing the digital euro to be tested in real-world conditions under a regulator's supervision. It will enable mitigation of potential dangers before large-scale deployment. For example, the European Blockchain Regulatory Sandbox launched by the European Commission is supposed to provide a framework for regulatory dialogue to increase legal certainty for innovative blockchain solutions. This sandbox will, every year, support projects from 2023 to 2026, including public sector use cases within the European Blockchain Services Infrastructure (Digital Strategy, 2023).

Another significant approach is the formulation of strict cybersecurity policies. Keeping the digital euro secure from cyber-attacks requires periodic audits in security matters, deploying real-time monitoring systems, and implementing incident response mechanisms to handle breaches in the best possible manner. Ensuring this digital currency is secure will gain and continue the public's trust in it as a safe digital currency (Ballaschk & Paulick, 2021).

Equally important is data privacy. Existing data protection regulations, like the GDPR, are needed to protect user information. Protecting user information through measures such as

anonymizing data and using secure storage solutions also means adherence to legal and ethical standards. Collaboration with private entities, such as financial institutions and technology companies, could bring further security and efficiency to the infrastructure of the digital euro through sharing expertise and resources (Allen et al., 2020).

Complete equity in digital access, both for citizens and businesses, will also be necessary if the full potential of the digital euro is ever to be realized. Unfortunately, this also means that improving digital literacy will have to come through targeted education programs. Such programs would provide underserved elderly and rural residents with the tools and competencies to enter the digital financial services environment. These educational programs will bridge the gaps in the digital divide and ensure increased participation in the digital economy. Other measures to utilize the digital euro widely include investments in digital infrastructure, such as extended broadband access and mobile network coverage (Lee et al., 2021).

Other measures that will drive the extensive use of the digital euro are investment in digital infrastructure, including extension of broadband access and increasing the coverage of mobile networks. The development and maintenance of such fundamental infrastructure can be well achieved under effective collaboration among public and private stakeholders (Brunnermeier & Landau, 2023). Access to affordable digital devices will make it easy for low-income earners to join digital financial services. In practice, this would be a balanced means of subsidies, financing, recycling of devices, and community access points. Another critical consideration should be that digital euro platforms are user-friendly and accessible for people with disabilities (Brunnermeier & Landau, 2023).

Another critical issue is making the digital euro platforms user-friendly and accessible to persons with disabilities. Hence, universal design principles are considered to ensure digital financial services are inclusive so the benefits will reach all segments of society. Incentives will come through banks offering low-cost accounts or reducing complexity while onboarding users (Tronnier et al., 2022). Such strategies and policies will help the European Central Bank and other stakeholders effectively mitigate risks associated with the digital euro. In that respect, they should ensure all access to digital financial services to promote financial inclusion for expanded economic activity in the Eurozone. This set of measures would ensure that the potential benefits of a digital euro are maximized while mitigating possible downsides, hence turning it into a successful game-changing financial instrument (Digital Strategy, 2023).

6. Comparative Analysis

The development of CBDC has been gaining speed worldwide, with many nations currently researching and developing digital forms of their respective fiat currencies. In this regard, a

comparative analysis of design, implementation, and diffusion strategies regarding the digital euro, the digital yuan, and any other CBDCs would contribute much value to inputs in the Eurozone.

6.1 Design and Technological Frameworks

The digital yuan, or the e-CNY, is a central bank-issued digital currency developed by the PBOC. It is based on a centralized ledger system, giving the PBOC complete control over issuance and distribution. By this design, the PBOC can observe who uses the money in real-time, which also greatly helps AML and CTF efforts (Atlantic Council, 2024).

In contrast, the ECB regards the digital euro as a complement to cash, not a replacement. The ECB is considering a two-tier system: the central bank issues the digital currency, but distribution and customer interaction are managed by supervised intermediaries, including banks and payment service providers. This approach will leverage existing financial infrastructures and make them widely accessible (Atlantic Council, 2024).

Other countries, such as Sweden with its Krona project, are considering CBDCs because of issues with falling cash use or to guarantee that the public can access central bank money in a digital economy. The Krona pilot is built on DLT to test its feasibility and integration with existing payment systems (Bank for International Settlements, 2024).

6.2 Adoption Strategies and Implementation

Extensive pilots of China's digital yuan have been conducted across various cities for different use cases, such as retail payments and government disbursements. The PBOC has worked with commercial banks and technology companies to encourage its use, including incorporating the e-CNY into mainstream mobile payment apps like Alipay and WeChat Pay. These have yielded high transaction volumes, illustrating increased public acceptance (Barrdear & Kumhof, 2022).

The ECB, on the other hand, is in the investigation phase of the digital euro project. It has conducted public consultations to gather input on design features and is engaging with stakeholders to assess potential impacts on the financial system. The ECB emphasizes that the digital euro should be accessible, secure, and efficient, serving as a means of payment without compromising financial stability (Atlantic Council, 2024).

The Sand Dollar is one of the first fully deployed CBDCs in the Bahamas. Its usage is focused on financial inclusion by dispensing digital financial services to underserved communities across the archipelago. The Central Bank of The Bahamas partners with local financial institutions to facilitate uptake and guarantees its interoperability with prevailing payment systems (Bank for International Settle, 2024).

6.3 Lessons for the Eurozone

The experiences of the other CBDC initiatives have essential lessons for the Eurozone as they advance the development of the digital euro. This underlines a primary lesson: public-private collaboration will play an indispensable role. Much of China's success with the digital yuan results from partnerships with commercial entities that play a critical role in promoting adoption. By collaborating with private sector stakeholders, the European Central Bank can leverage existing infrastructure and expertise to enhance user experience and operational efficiency (Atlantic Council, 2024).

Another lesson is the value of pilot programs and phased implementation. The digital yuan and Sweden’s e-krona have utilized pilot programs to test functionalities and address potential challenges before full-scale rollout. These trials allow central banks to refine their CBDCs based on practical insights. Similarly, the ECB could adopt a phased approach, starting with limited pilots to gather data and fine-tune the digital euro’s design and implementation (Bank for International Settlements, 2024).

The Bahamas' Sand Dollar initiative underlines another critical issue: financial inclusion. The Sand Dollar caters to the needs of the underserved, making digital financial services accessible to everyone. The same could happen with the digital euro: its option for inclusive payment solutions should target Eurozone residents without access to traditional banking and promote further financial inclusion (Bank for International Settlements, 2024).

Issues of interoperability and integration are equally fundamental for the success of any CBDC. Of utmost importance is the design of the digital euro to fit into current payment systems and those of other CBDCs. Ensuring interoperability would support domestic payment systems and ensure cross-border transactions are efficient, thus making the digital euro more useful and globally competitive (Náñez Alonso et al., 2020). All these lessons detail a path through which the Eurozone can create a robust, inclusive, and effective digital euro.

7. Conclusion

The development and introduction of the digital euro mark a sea change in the evolution of the financial and economic environment of the Eurozone. A digital currency of this sort can be instrumental in addressing such key priorities as economic recovery, digital transformation, and financial inclusion while maintaining the stability and integrity of the financial system. As pointed out in this analysis, the digital euro is supported as a tool instrumental to the management of post-crisis recovery and transition towards an increasingly digitized economy.

Key observations underline that the digital euro might be associated with a potentially significantly improved efficacy of monetary policy. Real-time data access and better liquidity control would provide more fine-tuned tools for the ECB's monetary interventions, especially in economic turbulence. Beyond this, another significant potential economic benefit of the digital euro is facilitating payment mechanisms and transaction cost reduction to create an efficient and inclusive financial environment.

The digital euro will close the gap in serving the underserved, who suffer from financial exclusion due to a lack of accessible digital payment methods. Embedding offline capability and universal design principles will help the ECB secure the digital euro's reach across demographics, further expanding economic participation and fostering inclusive growth across the Eurozone.

However, the introduction of the digital euro also comes with complications. Given privacy and cybersecurity concerns, stringent protective measures are needed to uphold trust and reduce associated risks. Likewise, replacement risks for conventional financial players will call for collaborative strategies that help them adjust to the changing economic environment. Taking lessons from other CBDC projects, such as China's digital yuan and Sweden's e-krona, the ECB can take the best from those experiences and use pilots along with public-private partnerships to guarantee the full accomplishment of the process.

The long-term consequences of the digital euro will also spill over beyond the Eurozone. The higher the role of virtual currencies, the more the digital euro is bound to amplify the euro's relevance within the international financial system as a reserve currency and further facilitate cross-border transactions. It is also symbolic of the Eurozone's commitment to innovation, sustainability, and preparedness for an increasingly digitized world economy.

In sum, the digital euro epitomizes the vision of the Eurozone for a forward-looking, inclusive financial system that is, a secure one. Its strategic importance, underlined by recovery, innovation, and redefining the future of money, is there, even as serious challenges lie ahead. With careful planning and execution, the digital euro could become a cornerstone for a resilient and modernized Eurozone economy.

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EU AI ACT WENT LIVE:

EUROPE ENTERED INTO NEW ERA

Galia Mancheva[1]

Abstract:

The present paper aims to analyze the development of Regulation (EU) 2024/1689 and its impact on businesses operating within the European Union. The stages of the regulatory process are systematically outlined, reflecting the significant discourse and modifications that occurred following the initial announcement. A key aspect of the regulation is its risk-based approach to artificial intelligence, which is examined in the context of contemporary risk management principles. The analysis considers the regulation's implications for different stakeholders, including policymakers, businesses, and technology developers.

This study investigates the hypothesis that Regulation (EU) 2024/1689 fosters new opportunities for businesses in the European Union and positions Europe as a global leader in artificial intelligence governance. The research identifies specific economic and technological advancements facilitated by the regulation and discusses its potential to shape the competitive landscape of the IT sector and other industries. By providing a systematic assessment of the AI Act's consequences, the paper differentiates its contribution from existing research, particularly Mancheva (2022), by focusing on the regulatory implementation phase and its tangible effects on innovation ecosystems.

Keywords: *artificial intelligence, European union, regulation*
JEL: *C51, C52, C53, C65, C67, L21, L22, L25*

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Introduction

Artificial Intelligence (AI) has become one of the most transformative technologies of the 21st century, reshaping industries and driving innovation across the globe. The European Union's Artificial Intelligence Act (EU AI Act), introduced in 2021 and coming into force in 2024, is the first comprehensive regulatory framework designed to govern AI technologies based on their associated risks. As AI systems become increasingly integrated into various sectors such as healthcare, finance, and manufacturing, the need for regulation that balances innovation with safety and ethical considerations has never been more pressing.

The EU AI Act seeks to address these challenges by categorizing AI applications into different risk levels, from minimal to unacceptable, and imposing varying degrees of regulatory oversight based on these classifications. The primary aim of the legislation is to protect European citizens from harmful AI applications while simultaneously fostering innovation and maintaining Europe's competitive edge in the global AI landscape. By setting clear guidelines and requirements for AI developers, the EU aims to ensure that AI technologies are deployed in ways that are both ethical and beneficial to society.

This paper explores the implications of the EU AI Act for businesses, particularly focusing on the IT sector, and provides an in-depth analysis of how the regulation may influence investment trends, competition, and economic growth within the European AI ecosystem. By examining both the opportunities and challenges presented by the Act, this study aims to provide insights into how businesses can navigate the evolving regulatory landscape while positioning themselves for success in the new technological era defined by AI.

This study extends prior research, including Mancheva (2022), by focusing on the post-enactment implications of the EU AI Act rather than its initial legislative proposal. While Mancheva (2022) examined the theoretical underpinnings and anticipated policy outcomes of AI regulation, the present paper evaluates the practical consequences of the enacted law, particularly its effects on business operations and industry-specific adaptations.

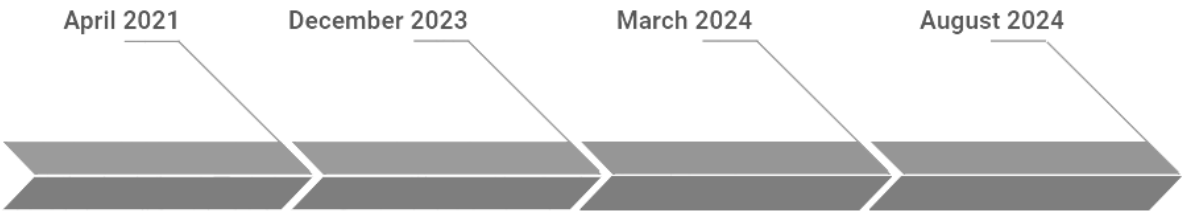
The research contributes to existing literature by providing an in-depth assessment of how the regulation influences business models, compliance strategies, and investment patterns. Moreover, it offers a comparative analysis of regulatory approaches in different jurisdictions, highlighting the EU’s leadership in AI governance relative to the United States and China.

1. Regulation (EU) 2024/1689 Overview

On August 1, 2024, the European Artificial Intelligence (AI) Regulation (EU) 2024/1689, commonly referred to as the EU AI Act, officially entered into force, marking a significant milestone as the world's first comprehensive legal framework for artificial intelligence (see Figure 1). The regulation aims to mitigate AI-related risks by restricting systems that pose unacceptable threats, establishing stringent requirements for high-risk applications, and imposing obligations on AI developers and deployers. At the same time, it seeks to encourage technological advancements by providing incentives for businesses to leverage AI for competitive advantage.

The regulation defines artificial intelligence as a dynamic and evolving set of technologies capable of delivering economic and social benefits across industries. This definition represents a shift from John McCarthy's initial conceptualization in 1956, which primarily framed AI as the science of constructing intelligent machines. The modern perspective acknowledges AI's capacity to drive economic growth while simultaneously ensuring societal protection.

Figure 1. EU AI Act timeline



Source: author's figure

The regulatory journey commenced with the European Commission's proposal in April 2021, followed by extensive consultations with business representatives and policymakers at a global level. The finalization process was notably influenced by the emergence of generative AI technologies, such as ChatGPT in early 2023, which prompted European authorities to

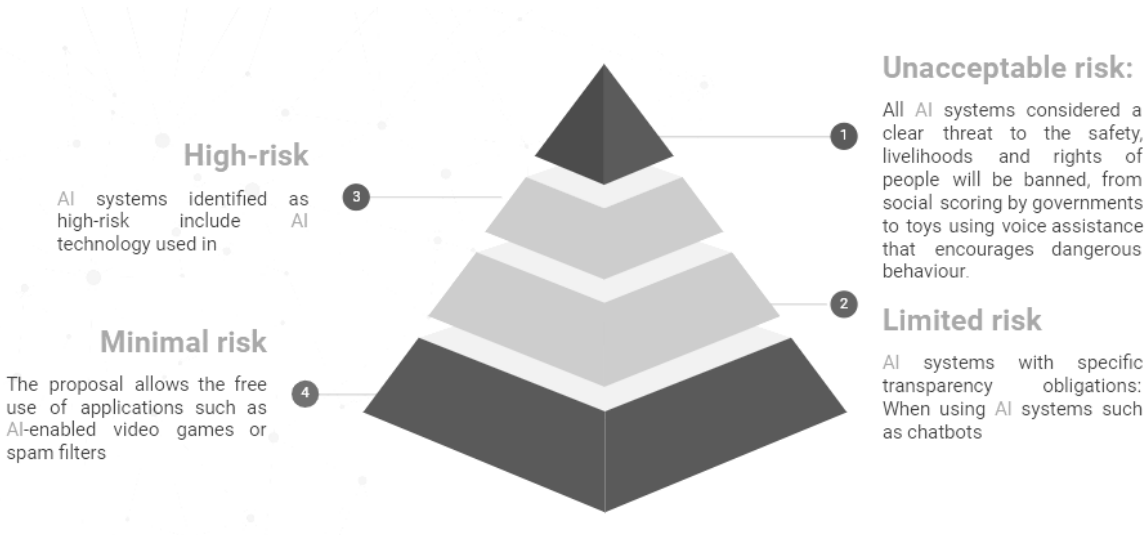
reconsider the classification of general-purpose AI models. By March 2024, the Commission had designated these models as high-impact general-purpose AI, subject to systematic evaluation and reporting requirements. Following extensive deliberation, the final version of the regulation was published and entered into force on August 1, 2024, setting forth a series of compliance deadlines for affected entities.

2. Affected Parties and Risk Categories

The EU AI Act applies to both public and private entities within and outside the European Union, provided that an AI system is either marketed in the EU or impacts individuals within the region. The obligations outlined in the regulation extend to both AI providers (e.g., developers of AI-driven recruitment tools) and implementers (e.g., banks utilizing such tools in hiring processes). However, certain exemptions exist, including AI systems used exclusively for research, military, defense, or national security purposes.

A core aspect of the regulation is its adoption of a risk-based approach, categorizing AI applications into four tiers based on their potential impact: minimal risk, limited risk, high risk, and unacceptable risk. The classification structure underscores the EU's dual objective of safeguarding citizens' rights while fostering responsible AI development (see Figure 2)

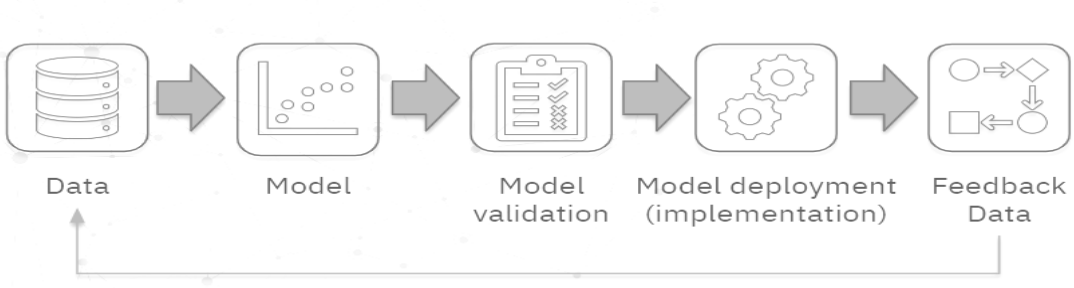
Figure 2. A risk based approach



Source: digital-strategy.ec.europa.eu

High-risk AI systems, such as AI-powered medical diagnostic software or financial decision-making tools, are subject to stringent compliance requirements, including risk mitigation strategies, the use of high-quality datasets, and human oversight mechanisms. Meanwhile, AI applications deemed to pose unacceptable risks, such as those enabling mass surveillance or social scoring, are explicitly prohibited. The regulation's emphasis on risk categorization reflects the EU's broader objective of establishing a robust governance framework that balances innovation with ethical considerations.

Figure 3. High risk system



Source: IBM

Due to the Regulation (EU) 2024/1689, article 3, point 1 an artificial intelligence high-risk system (AI system) is defined as: "*A machine-based system designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment and 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*"[2].

Thus, an AI system can be explained by five main elements (see Figure 3):

- First element – Data – the stage where the data management is performed;

[2] https://artificialintelligenceact.eu/assessment/eu-ai-act-compliance-checker/

- Second element – Model – the stage where the algorithms and the model are developed;
- Third element – Model validation – the testing stage where the model performance meets the initially set algorithm expectations;
- Fourth element – Model deployment and implementation – the stage where the model is applied to the chosen system.
- Fifth element – Feedback data – the stage where the output can be seen.

Due to the risk management concepts and requirements stated in the regulation, the five element systems have to be revised on regular bases depending on European and local rules. The requirement is needed in order to ensure high quality and competitive advantage of European Union in global leadership in trustworthy AI.

3. Impact on the IT Sector and Broader Industry Implications

The European Union Artificial Intelligence Act (EU AI Act) is a landmark regulatory framework that aims to govern AI technologies based on their risk levels. This legislation has significant implications for the IT sector and other industries, as it imposes strict requirements on high-risk AI systems while promoting innovation in low-risk applications (European Commission, 2021).

The potential impact of this regulation on the IT sector is substantial. Companies developing AI-driven solutions will need to invest in compliance measures, which may increase operational costs (Binns, 2022). Additionally, the act could lead to a shift in AI development strategies, as firms prioritize low-risk AI applications to avoid stringent regulatory requirements. This shift may result in increased competition among AI developers focusing on lower-risk solutions while discouraging high-risk innovations that require complex regulatory approval (Goodman & Flaxman, 2017).

Beyond the IT sector, industries such as healthcare and finance are also expected to experience significant transformations. AI-driven diagnostic tools, for example, may face more rigorous approval processes, potentially slowing innovation while enhancing user safety (European Commission, 2021). Financial institutions relying on AI for risk assessment and fraud detection

will need to ensure compliance with transparency requirements, which may increase regulatory overhead and slow the deployment of new AI models (Binns, 2022).

Additionally, the regulation incentivizes investment in AI governance and compliance services, giving rise to a burgeoning market for AI auditing, regulatory consulting, and compliance software solutions. As a result, European businesses may benefit from a competitive edge in the emerging global landscape of trustworthy AI.

4. AI Act Application and Company Benefits

The AI Act will apply two years after its entry into force on August 2, 2026, with the exception of the following specific provisions:

- the prohibitions, definitions and provisions relating to AI literacy shall apply 6 months after the entry into force of the act, namely until 2 February 2025;
- the rules on governance and obligations relating to general-purpose AI shall apply 12 months after the entry into force of the act, namely until 2 August 2025;
- the obligations relating to high-risk AI systems, which are classified as high-risk because they are integrated into regulated products listed in Annex II (List of Union harmonisation legislation), shall apply 36 months after the entry into force of the act, namely until 2 August 2027.

Main business benefits can be summarized, as follows[3]:

- AI can be applied to most SME activities;
- AI can improve and facilitate the business of SMEs;
- AI enables SMEs to change business models and practices that will increase productivity and growth potential;
- AI can spark a new product revolution;
- AI will free employees from low-value-added tasks and provide an opportunity to reorganize and upgrade;
- AI will bring change to the company's internal value chain.

[3] Mancheva, G. (2022). European Union Regulatory Framework on Artificial Intelligence (SMEs). JOURNAL OF DEVELOPMENT STUDIES, 2. https://doi.org/10.52340/jds.2021.03

European Union takes significant steps to regulate artificial intelligence and promote investment in innovation and deep technologies. The European Innovation Council (EIC) plans to invest €1.4 billion in deep technologies and high-potential start-ups from the EU in 2025. This is set out in the EIC Work Programme for 2025, which includes an increase of €200 million compared to 2024. The aim is to foster a more sustainable innovation ecosystem in Europe.

5. Main Outcomes and Conclusions

The findings of this study underscore three primary outcomes:

The regulation enhances human rights protections by establishing a risk-based AI governance framework, ensuring that high-risk applications are subject to rigorous scrutiny while outright banning technologies deemed detrimental to fundamental rights.

The introduction of clear and transparent regulatory guidelines fosters a more structured AI development and deployment environment, reducing legal uncertainties for businesses while promoting responsible innovation.

The EU's strategic focus on deep technology development, reinforced by initiatives such as the European Innovation Council's planned €1.4 billion investment in AI and emerging technologies, positions Europe as a key player in the global AI ecosystem.

In conclusion, the EU AI Act represents a pivotal moment in AI regulation, reinforcing the European Union's ambition to establish itself as a global leader in trustworthy artificial intelligence. By imposing strict compliance measures while simultaneously encouraging AI adoption through targeted incentives, the EU sets a precedent for ethical AI governance. To fully capitalize on these opportunities, businesses operating within the EU must proactively adapt to the regulatory landscape, leveraging compliance as a means of fostering trust and competitive differentiation in an increasingly AI-driven economy.

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THE DANGERS OF POLICY FOCUS ON DIGITAL TRANSFORMATION

Gordon Kerr

Abstract: *Whilst it is easy and comforting to accept that policymakers widely embrace digital transformation, it is rather important that scrutineers remember the recent near-misses. Consumer Banking, Smartphones, FinTech all provide a host of examples of near-misses, none of which were stopped and or blocked by Regulators.*

The goal of this paper is to draw readers' attention to a few experiences which the author has experienced, both in London and Sofia, and to encourage a substantial slow-down of the overall initiative.

Keywords: *Digital transformation, FinTech, Consumer Banking, UK Neobanks, EU Neobanks,*

1. Executive Summary

Whilst it has become very fashionable for western governments to champion digital transformation (DT), a number of flawed assumptions, together with the law of unintended consequences, dictate that now is the time to pause, reflect and assess if it is beneficial for societies to continue along the DT path. The author, for one, feels that we have gone too far. With DT comes the insertion of AI, chatbots, and automated response and increasing difficulty for citizens to gain the attention of a customer service human being. In the private sector this is bad enough, as banks and other companies adopt DT at least they have the incentive to maintain customer relationships and earn profits. In the public sector there are no such incentives with the obvious result of a reduction of quality, immensely long waiting times for responses, and no downside to the public sector whose monopolistic control of citizens is hardwired.

For reasons of brevity the author now sets out certain areas where DT has gone so far that customers are frankly scared of raising issues for fear that they will not only gain no resolution, but that their security and funds may in fact be compromised merely by raising concerns.

2. Consumer Banking

Having held a bank account with Lloyds since arriving at boarding school in 1976, your author has experienced every iteration of bank customer service in the intervening 48 years. My first employment on graduating was in fact with Lloyds on their management training programme. In all my trainings it was drummed into me that of paramount importance is the maintenance of the customer relationship, of not losing the customer to eg Barclays Bank.

Sadly, for the vast majority of customers, banks appear to be no longer concerned on this point. Two reasons: firstly, the never ending promulgation of costly regulations means that the 'base profit' threshold which banks need to earn in order for specific customer relationships to be profitable as opposed to loss making has risen sharply. Secondly, the continuing banking crisis which incepted 2007-09 and has never been properly addressed, has resulted in the permanent abolition of the interbank market. For clarity, despite all the weaknesses of the fractional reserve banking model, prior to the Great Crash it was at least functioning ostensibly normally in that at the end of each business day after payments made and received by customers of Lloyds resulted in a net cash surplus or deficit, traders in the money markets department of Bank A would notify "the interbank market" that it had an overnight cash surplus or deficit. The interbank market operated to clear these differences among the banks. Crucially the interbank market operated WITHOUT collateral, because each bank was assumed to be of undoubted credit solvency.

Such assumptions disappeared when governments, in your author's view foolishly, chose to burden citizens by borrowing money and basically donating it to failed banks who were thus propped up like dinosaurs. Further direct consequences of these regrettable bailouts were that all western central banks set interest rates at or near zero levels to reduce the visible cost of national borrowings. This interest rate policy, together with the erosion of trust and confidence between banks as evidenced by the detah of unsecured, uncollateralized interbank markets, resulted in commercial banks earning trivial to zero returns of customer deposits which they continued to hold in cash. The only safe course of action was to deposit these funds with eth central bank who for many years between 2007 and now were offering negative returns on such deposits. Many banks, not only in Euroipe but also in USA openly advertised that they had no appetite for new customer business and frankly were all to happy to shut down often long standing customer accounts should the individual dare to raise his/ her head above the parapet by, for example, questiong whether rainbow flag redecorations of bank branches during LGBTQ+ month were a sensible use of bank funds.

3) Smartphones, calendars, autoresponses and spam messages

Your author is staggered by the lack of questioning as to whether the ubiquitous appearance of smartphones, since the demise of Blackberry around 2010-12, is beneficial. Once again it appears that DT progress is assumed to be beneficial, whereas in reality this assumption is highly open to question. A few examples.

a) Digital calendars. Your author has a 2022 Apple SE smartphone, with tons of RAM and lots of attractive features. However, the embedded MS Outlook email system has at its core a calendar function which it is now impossible for me not to use. But the operation of this calendar is far from perfect. One of your author's projects involves weekly Googlemeet calls with my small group of teammates.

   These have been occurring throughout calendar 2024. However, about three months ago the date was switched from Wednesday each week to Thursday. Since the switch, every Wednesday morning my phone pings with a Calendar Message. When I open the message I see my day's schedule; if I have put no other engagements in my calendar I simply see the Wednesday meeting with lines through the entry indicating that it is cancelled. I do not want to receive these pointless pings but have no idea how to delete and cancel them.

b) Autoresponses. Every day I receive about 30 or 40 spam emails from publications or websites which I once logged into, and was obliged to enter my email address in order to read the odd article. Alright, as regards this point I do in fact know how to cancel the messages for the future, but receiving them is highly irritating and would never have occurred in the pre-smart phone era when the sender would have had to pay two or three euros for postage. Free communications mean spam communications.

c) Choice of communication protocol. Owing to time constraints I have not checked this point with colleagues in Bulgaria or other EU member states, but it is absurd that if I want to contact my bank I am forced to use the telephone. Always there are long waiting times, typically ten to twenty minutes waiting to speak to a human. Then a time consuming identification process. Invariably the bank employee wants to transfer me to another department – the process changes all the time. When he/she does so, the painfully slow identification process I have just undergone is invalidated and starts again.

   If I am lucky, only one transfer will be required but often two or three are necessary. For the aove reasons it can easily take one hour on the phone to clarify a relatively simple question. It is immensely frustrating that some banks use text messages or even emails to reach me, but they NEVER agree to receive messages on these platforms.

The bank business model is crystal clear. My time is of no value to them so they see no problem in consuming yonks of my time whilst they invest the minimum of their time.

d) Spam messages. Criminals are becoming increasingly sophisticated and the only safe assumption is that every email and text message we send is being read and studied by criminals. Fraud is increasing exponentially in the UK and many individuals fail to take relatively obvious steps to prevent losing substantial sums of money. I recently (2017) took out a mortgage on a second home in order to help a family member. The lender provided the legal service for free, but it was an "e- legal " service meaning ath I had no personal relationship with anyone who worked in the (Indian) legal team. All the emails had a certain format. It is standard practice for criminals to duplicate this format and send a spoof email demanding the 10% deposit payment one month before title to the property is transferred. Rather than call the lender and check the details many UK citizens simply make the payment, often of GBP 40,000 or more to the account of an Albanian criminal.

   The bank usually forces the customer to absorb this loss arguing, correctly, that the customer should have checked the genuineness of the email and the stated bank account details. This position is wring; and also counter to money laundering rules that require banks to carry out identity and fraud checks before opening accounts. But this observation is of scant consolation to the defrauded individual(s).

4) **Fintech – Revolut, Likely Insolvent**

a) Consumer Facing Fintechs; Struggling for Profits and Remaining Private

Two years ago your author wrote about Germany's most prominent neobank, N26. It had then recently withdrawn from both the US and the UK for regulatory reasons but was valued at USD 9bn based on its then latest capital raise, despite reporting 2020 losses of EUR 151mm. Its losses have since nudged upwards, EUR 172 mm and 213 mm in 2021 and 22 respectively. It also had problems with its regulator because of lapses in anti-money laundering controls; BAFIN fined it EUR 4.5mm in 2021 and subjected it to a severe cap on customer onboarding that was only slightly relaxed last December. In 2023 it laid off 4% of its staff and announced a pivot into stock trading and selling ETFs. One wonders today if any path to profitability is possible.

Two years ago I also reviewed two loss making British neobanks[1], Monzo and Revolut[2], both of whom continue to struggle, if we treat BDO's (the auditor's) qualification of Revolut's 2021 accounts: *"unable to satisfy [BDO] as to the completeness or occurrence of revenue totalling £478 million"* as eliminating the claimed trivial surplus.

I recognise that well managed neobanks can be successful. I have previously praised Wise and now compare the two with Starling Bank, formed in 2014, which has made profits for two years. Monzo has a higher profile but is still lossmaking. Let's compare some financial KPIs:

Table 1

	Customers (GBP mm)	Gross Revenue (mm)	Profits (losses) (mm)	Staff number and y.o.y growth
Starling March 2023	3.6	453	195	2700 (+39%)
Monzo Feb 2023	7.5	355	(116)	2547 (+13%)
Revolut December 2022	26	923	(25)	6000 (+100%)

It is entirely reasonable for start ups to focus on gross revenue rather than net profits when in their infancies. But Monzo and Revolut are almost ten years old, with fairly large customer bases (Monzo is the 7th largest UK bank by customers) and questions must arise as to the viability of their business models. Monzo aims to achieve profitability by expanding both into the US and Europe at the same time. In the US it remains unable to obtain a banking licence and will partner with a US bank which will be a drag on earnings. Europe opens up exposure to new cultures, languages and rules, and has proved tough for US and UK banks before. Monzo may of course succeed, but the path to profitability does not look easy.

[1] Defined as app based (mainly mobile) branchless banks, often with full banking licenses eg Starling and Monzo

[2] Revolut is a "Neobank" technically speaking only in Europe where it has a banking licence; in the UK it is only an "e-money institution".

If Monzo's path to profits seems uphill, Revolut's seems steeper. Revolut's numbers and press announcements appear to typify why investors remain cool on Fintech. Revolut's staff numbers grew from 6,000 Q4 2022 to 10,000 presently, and are set to grow to 11,500 by year end[3]. It appears to be spending all its free cashflow on new employees and advertising in a dash for growth, and has been unable to raise capital since 2021[4]. Yet, as the following table shows, its revenue per customer is low and its private valuation looks dizzy:

Table 2

	Revenue per customer (GBP)	Balance Sheet Shareholder Equity (GBP bn)	Latest private valuation (GBP bn)
Starling	203	0.7	2.7 (July 2023)
Monzo	112	0.5	4.1 (May 2024[5])
Revolut	35	1	24* (October 2021)

*Perhaps unsurprisingly, investors such as Molten and Schroders have marked their Revolut holdings down by about 50% to GBP 12 bn in the past year.

b) Likely Regulatory Response – Are Regulators Paying Attention to Neobank Financial Viability Warning Signs?

For the above reasons we would expect regulators to be paying a little more attention to the risks of consumer facing fintech. Recent history shows that time and again regulators have missed warning signs, perhaps because they don't want to see them. The US missed multiple warnings prior to the 2008 collapse of Madoff's high net worth fund, and Germany's Bafin was obviously embarrassed over Wirecard in 2020. Revolut's numbers, as tabulated above, surely raise amber flags. Also it has been consistently late with regulatory filings, and its most recent two years of accounts (2021 and 2022) are were only audited with significant qualifications.

[3] Revolut to boost staff by 40 per cent this year amid rapid expansion (cityam.com)

[4] Revolut - Funding, Financials, Valuation & Investors (crunchbase.com)

[5] Monzo valued at £4.1bn after £150m funding to support expansion and new products (msn.com)

5) **Public, not Private Sector**

Much of the above has addressed difficulties which consumers experience with private sector companies. Most consumers just about manage to cope, although the incidence of fraud and monetary loss suffered by elder generations is increasing rapidly and I was compelled to take my late mother "offline" in the last couple of years in her life owing to the frequency with which she was being tricked out of small but annoying sums of money – typically 50 or 100 gbp a couple of time per month.

Nonetheless, the problems increase exponentially when dealing with the local or national government. So successful have local governments become in the UK at establishing barriers such that their taxpaying citizens are forced to deal with AI and chatbots, that it is now serious government policy to reduce staff hours to a 4 day week but on the same pay, in effect a 25% pay increase for reduced productivity.

The crucial difference between the public and private sectors in this contect is that few public servants have any interest in saving public funds; their own organisation and their personal terms of employment are of far greater importance. Under the heading "Woke Waste" journalist Charlotte C Gill recently listed the following examples of extraordinary waste of UK public funds:

- GBP 841,830 in financing research into "The Europe Gay Porn Built 1945-2000
- GBP 136,909 "Perverse Collections, Building Europe's Queer and Trans Archives"
- GBP 805,769 "Decolonising the Museum: Digital Repatriation of the Gaidinliu Collection from the UK to India"
- GBP 185,627 "Trans Performance Now: Glitching cisgenderism"
- GBP 805,745 "Diverse alarums: centering marginalised communities in the contemporary performance of early modern plays"
- GBP 205,543 "Decolonial Ecologies in the 21st century insular Hispanic Caribbean film"
- GBP 759,293 "Comics and Race in Latin America"
- GBP 81,635 "Listening to the 85%: exploring how recording and listening to underwater sounds can increase environmental awareness on the Isle of Man"
- GBP 123,470 "Decolonizing South East Asian sound narratives"
- GBP 783,083 "Everything is Connected: Conspiracy Theories in the Age of the Internet"
- GBP 200,462: "Decolonizing the Page: The Visual Politics and Poetics of Postcolonial Arabic Publications".

For brevity your author ends the list here, but there are many, many more. Two points leap out from Mr Gill's work[6]. Firstly, many of these grants of UK taxpayer funds are applied for and

[6] @CharlotteCGill account on X, 30/10/2024

awarded to foreign students studying at foreign universities or institutions; thee is no requirement for any of the funds to be spent in the UK. Secondly, using the word "decolonizing" in the application seems to be a surefire way to fast track the application for funds.

Of course this is meerly one study of UK wastefulness. Others have produced similar lists for the US. And of course the large elephant in the room is Net Zero. It was recently announced that the United Nations has "lost" USD 41 billion of Net Zero funds. This is a staggering sum, but few readers were surprised.

6) Conclusion

There is a popular and true saying, "*Never trust a public servant with a computer and bulk data*". There are multiple examples of public servants leaving laptops or data sticks on trains, in buses and taxis. A senior UK tax official admitted losing a data stick with the personal details of almost every UK taxpayer on a data stick. The adult hookup site for married people wishing to cheat: "Ashley Madison" was effectively bankrupted and needed recapitalisation in 2015 when hackers stole, and subsequently published, all of its customer data including names, addresses, sexual fantasies and credit card details.

One rarely mentioned consequence of the now decades long trend of digital transformation is the increasing length of documents. As a junior officer at Bank of America International in 1985 I was involved in syndicating one of the then largest loans in the world; USD 14 billion for SOCAL (Standard Oil of California). The termsheet which I codrafted was 4 pages long. Hardly any capital markets transactions are launched these days with termsheets of under 50 pages. Almost every day the ECB publishes a new paper on some aspect or other of monetary policy or bank supervision. Few of these papares are less than 100 pages long. It is common knowledge that few policymakers or academics typically read more than the Executive Summary and Conclusion. Few individuals can work all day and devour a number of 100 page papers at night.

My 4 page 1985 termsheet is shorter than the disclosures section in modern capital markets termsheets. Looking back, we did not use disclosures; the concept was not invented until the 1990s.

ANALYSIS OF THE EVOLUTION OF INCOME INEQUALITY – CAUSES AND EFFECTS. COMPARATIVE ANALYSIS: ROMANIA-EU27

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Abstract

The study analyzes the evolution of income inequality, focusing on its causes and effects, with a comparative perspective between Romania and the EU-27. Using data from Eurostat, OECD, and national statistics, the research identifies key drivers of income disparity, including economic growth, employment structure, fiscal policies, and social transfers. The paper explores the implications of income inequality on economic stability, social cohesion, and sustainable development. By contrasting Romania's performance with EU-27 averages, the study highlights differences in policy effectiveness and provides recommendations for reducing inequality through targeted fiscal and social measures.

Keywords

Income inequality, Romania, EU-27, economic disparity, fiscal policy, social transfers, comparative analysis, economic growth, social cohesion.

JEL

-D31- Personal Income, Wealth, and Their Distributions

-H23 - Externalities; Redistributive Effects; Environmental Taxes and Subsidies

-I32 - Measurement and Analysis of Poverty

- O52 - Europe

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Introduction

Income inequality is a highly relevant and topical topic that has attracted increasing interest in both policy and academia in recent decades. We observe an alarming trend of increasing income differences, especially in developed countries, and this trend is also reflected at the level of the European Union, where inequalities have seen an intensification, including within the richest member states.

The notion of income inequality is often associated with market mechanisms, which seem to reward success and sanction failure. Although it seems to be a natural consequence of the functioning of the market, inequality is not closely related to it, but is considered necessary to motivate the individual and encourage interest in professional development. It is well known that inequality plays an important role in maintaining a competitive environment, essential for the proper functioning of the market economy. However, an excessive level of inequality can generate a number of social and economic problems, such as diminishing incentives, increasing social injustice and restricting opportunities for social progress.

It is crucial to maintain a proper balance of income inequalities in a society so as to ensure social stability. Therefore, careful examination of the causes, effects and implications of income inequality on economic development is necessary. A comparative analysis between the situation in Romania and that of the EU-27 offers a broad perspective on the differences at the level of the member states of the European Union and on the existing trends, allowing the identification of good practices and the formulation of recommendations adapted to the specifics of Romania.

My motivation to investigate this complex topic reflects a desire to understand the depth of economic inequalities and contribute to the development of effective policies aimed at reducing social gaps and promoting economic development. Through careful research and analysis of this phenomenon, the paper aims to make a significant contribution to the understanding of inequality and to the identification of appropriate solutions to combat it.

The general objective of this paper is to investigate and highlight the discrepancies and inequities in the distribution of income in Romania compared to the other member states of the European Union, as well as to understand their causes and consequences.

The specific objective of this paper is to analyze the various factors that contribute to income inequality, such as differences in education, occupation, gender or ethnic origin. Through comparative analysis we can obtain a clearer view of this circumstance and contribute to the development of more effective policies.

In Chapter I I will analyze inequality and the types of inequality: payment inequality, wealth inequality and income inequality. I will also talk about measurement techniques such as: the Lorenz Curve, the Gini coefficient or the Theil index. I will continue with the next sub-chapter where I present the causes and effects of income inequality. Income inequality is divided into three categories based on the complexity of the factors that determine income inequality. These are: non-economic factors, macroeconomic factors and microeconomic factors. In the next chapter I will carry out the comparative analysis regarding income inequality.

Chapter 1: Conceptualizing Income Inequalities

1.1. Review of the specialized literature on income inequality: from definition to measurement techniques

Inequality occurs when there is a difference or disparity between some people, groups or entities in terms of rights, opportunities or access to resources.

Economic inequality refers to the unequal distribution of wealth and opportunities among people belonging to different groups, communities, or countries. The upward trend of inequality can be expressed by the cliché: "The rich are getting richer and the poor are getting poorer." In other words, inequality captures the widening gap between the accumulated wealth or income earned by various categories of the population. Both Rousseau (2016) and Rawls (1971) argue that inequality can be acceptable as long as it does not affect the freedom and well-being of citizens. For Rawls, inequality is only permissible if it respects the principles of social justice, and for Rousseau it is important not to limit people's happiness and interests. If these conditions are not met, inequality can be considered excessive and unfair in a just society.
Economic inequality is of three kinds:

- Pay or earnings inequality is fairly easy to assess from available data sources; company payrolls are ubiquitous, and weekly or monthly earnings surveys are very common. Assessing income inequality is relatively easy in countries with reliable research and adequate financial reporting. But these are not many; The best income tax datasets are available for only 29 countries, most of which are English-speaking countries, so most of the income data comes from surveys.
- Assessing wealth inequality is more difficult and results vary depending on the definition of wealth used. Official means checks are only carried out in a few countries. Most people do not accumulate wealth from income earned through work, so not all people have the same financial assets.
- Income inequality represents a situation in which the distribution of income is unequal between people, with significant discrepancies between the amount of income acquired. This difference can be influenced by several factors, including sources of income, the number of people dependent on that income, and access to resources. In the field of economic development, income inequality is a topic of intense debate and analysis, being studied by scientists, economists and political leaders globally. Income plays an essential role in determining the quality of life, being an important factor in social stratification and having a significant impact on general well-being. At the level of specialized literature, there is a high interest in measuring and understanding the extent, causes and trends of income inequality, as well as in assessing the level of poverty faced by certain groups today. Conceptually, inequality represents an imbalance between two units of analysis or social groups. (Toma, C.A., Boboc, C., et al. 2021)

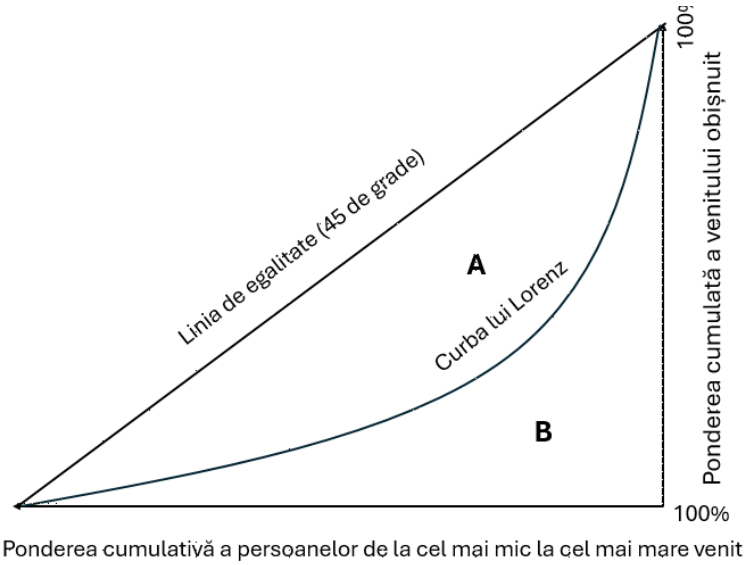
A distribution can be represented by a graph showing income, expenditure, pay or wealth on a horizontal line and the number of people at the same level of the variable x on a vertical line. Distribution starts from zero when it comes to income, expenses or payment.

1) The most widely used indicators for measuring income inequality are the Lorenz curve and the Gini index, but there are others such as the Theil and Atkinson indices.

2) The range is the simplest possible indicator of the distribution. The value measured in money is the distance between the highest and the lowest value in the sample for income.
3) A quartile is a statistical measure that divides a distribution into four equal parts. A quintile divides a distribution into five equal parts. A decile divides a distribution into ten equal parts. A percentage divides a distribution into one hundred equal parts. Quartiles measure the spread of values above and below the mean by dividing the distribution into four groups. Quartile divides the data into three points (lower quartile, median quartile, and upper quartile) to form four groups of data sets. The 4 quartiles are used to calculate the interquartile range, which is a measure of the dispersion around the mean. Just as the median divides the data in half so that 50% of the measurements are below the median and 50% above it, the quartile divides the data into quarters so that 25% of the measurements are less than the lower quartile, 50% are less than the median , and 75% are lower than the upper quartile. To avoid extreme values, the interquartile range examines only the middle part of the distribution – or the "middle 50% of observations". The interquartile range is calculated by sorting each observation in ascending order of income and then removing the lowest and highest 25% of the observations. The interquartile range is the rest of the range.
4) The Lorenz curve describes the cumulative income of the population by the value of the income (vertical axis) relative to the cumulative weight of the people who achieve these incomes (horizontal axis), and the distance between the Lorenz curve and the first bisector represents the case of income equality. The higher the income, the higher the level of inequality.
5) The Gini coefficient - invented by an Italian, Corrado Gini - is an indicator with values between 0 and 100 percent (a value close to 100 represents a high degree of inequality). If the Lorenz curve is represented by the function y = L(x), then the Gini index can be written as:
   G=1-2$\int_0^1 L(x)dx$

To better understand the Gini coefficient we can imagine the Lorenz curve, a simple graph that can be drawn for any distribution. To plot the Lorenz curve, first all members of a population or survey participants are sorted ascending by their income and divided into quintiles, deciles, or percentiles (the larger the split, the better). The quantiles are represented on the x-axis. On the y-axis, the portion of total income earned cumulatively in each quantile is represented. Thus, if the bottom ten percent earn two percent of total income, a point is drawn at (10.2), and so on. Connect the drawn points. The realized curve will be inclined below a line of 45 degrees, except in the case - not encountered in real applications - of total equality of income. It will start at point (0,0) and stop at point (100,100), since zero people inevitably earn zero income and all people inevitably earn all income. At each point on the curve, one can determine exactly what percentage of total income a person below that income level can claim. First, the area between the Lorenz curve and the 45-degree line is calculated - which, in the case of a 100-a-side graph, is the number 5000. The result is the Gini coefficient.

Figure 1. Lorenz curve



6) The Theil index is a measure of the entropy determined by the differences between incomes and is estimated as the average of the ratio between individual incomes and the average of incomes, weighted with the logarithm of the same ratio:

$T=\frac{1}{n}\sum_{i=1}^{n}\frac{x_i}{\bar{x}}ln\frac{x_i}{\bar{x}}$.

7) The Atkinson Inequality Index is an economic measure of income inequality developed by Anthony Barnes Atkinson. It is based on the per capita income that, if divided by the total population, would generate the same level of propserty that emerges from the observed income distribution. The class of Atkinson indices is assembled based on a welfare function, which involves the application of a normative parameter, $\varepsilon \geq 0$, called the inequality aversion parameter. The indices are estimated based on the following two relations, depending on ε:

$$A_\varepsilon = 1 - \left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i}{\bar{x}}\right)^{1-\varepsilon}\right]^{\frac{1}{1-\varepsilon}},$$

și

$A_1 = 1 - \left[\prod_{i=1}^{n}\frac{x_i}{x}\right]^{\frac{1}{n}}$, for $\varepsilon = 1$

8) The Pietra index derived from the Lorenz curve is a less popular indicator – also known as the Robin Hood index. Although it has many names, in practice it is rare. Pietra index calculation formula:

$H(x)=\frac{\sum\{i:x_i=>\overline{x}\}(x_i-\overline{x})}{\sum_{i=1}^{n}x_i}$

9) The Palma coefficient, a recent invention of the economist Gabriel Palma, represents the ratio of the total volumes of cash incomes of the 10% of the population with the highest incomes and the 40% with the lowest incomes.

$$K_{palma} = \frac{d_{10}}{d_1 + d_2 + d_3 + d_4},$$

where: d_i – total cash income of decile i.

The causes and effects of income inequality

Many factors influence income inequality, but understanding these factors allows us to regulate national income more effectively and to develop and implement economic policies specifically designed to distribute and redistribute income. Acemoglu and Robinson (2012) distinguish between extractive institutions and inclusive institutions, emphasizing that their quality influences the level of poverty and inequality in a society. Inclusive institutions promote the exploitation of resources for the benefit of the entire population and create equal opportunities, while extractive institutions favor the concentration of wealth and power in the hands of a small elite.

Income inequality is divided into three categories depending on the complexity of the factors that determine income inequality:

1) Non-economic factors - which vary depending on the personality of each person, such as:

- The unique capabilities of each individual. People's intellectual and physical capacities vary. While some people get high-paying jobs because of their exceptional intellectual abilities, others get high-paying professional sports jobs, and another category of people, called "regulars," get lower-paying jobs. Most people have abilities, capabilities and aptitudes in the average range. Since skills alone are often not capable of generating substantial returns, training and education must enhance natural skills;
- In addition, discrimination based on sex, age, nationality or social status can lead to income inequality in the workplace. The fight against discrimination in the labor market, which includes the elimination of wage disparities between men and women, has led to the reduction of labor income inequality;
- Level of education and training. Depending on the level of education and professional training, the level of income obtained varies significantly. Differences can be caused by current circumstances and a person's choice to go to high school or university. Furthermore, there are income differences due to differences in people's continued education;
- Productivity level and workload. The output and intensity of work are influenced by various factors, including the level of complexity of work, the difference between skilled and unskilled work, and the number of hours worked. All these aspects have an impact on the amount of money earned;
- Income growth is significantly influenced by luck and profitable relationships. Luck, the opportunity to "be in the right place at the right time" and political influence are important factors in obtaining high incomes. Conversely, a family's economic situation is affected by natural disasters, loss of breadwinner, unemployment, chronic diseases and accidents;
- Household incomes vary with demographic factors such as family size, employee-to-maintenance ratio, health status, location, and climate.
- Propensity to engage in risks. The ability to take risks is individual. Most people want a job that is safe, quiet, and offers secure, but not very high, earnings. In contrast, some people, such as entrepreneurs, are willing to take risks to run a business.

2) Macroeconomic factors - describe the state and efficiency of the national economy and include elements such as:

- Advances in technology People believe that new IT technologies will increase work productivity and general well-being. However, these technologies can lead to a disproportionate increase in the demand for capital and skilled labor, leading to an

increase in wage income inequality as a result of the automation of production processes;

- Setting the economy's minimum wage: A high minimum wage increases the wages of those at the bottom of the income distribution, thereby reducing income inequality. However, too high a minimum wage can negatively affect the employment of young people and low-skilled workers, thus reducing disparities;
- Globalization has become a driving force of economic growth and competitiveness in many countries. However, trade openness can have contradictory effects on levels of income inequality because, on the one hand, inequality increases when trade flows increase, which means that the wages of skilled workers increase; on the other hand, an increase in trade flows can also lead to a decrease in inequality, because the demand for low-skilled labor increases and real wages rise due to the influx of cheaper imported products;
- Educational policies can have a significant impact on reducing income inequality, because education influences the choice of professions, access to jobs and salary level;
- Income redistribution policy by introducing a system of progressive income taxation and social transfers;
- The increase in labor income inequality is caused by underemployment and ineffective government policy on labor protection, resulting in jobs with wages lower than the economic average.

3) Microeconomic factors refer to the organization in which a person works (industry, position on the labor market, organizational and legal form, development strategy, share of wages in the cost structure, etc.) and factors such as: household type, size, socio-economic status, etc.. Wage differences arise mainly from varied competition in various market sectors.

Income inequality can have economic, social, political and other consequences. According to A. M. Zernaeva, the increase in income inequality prevents the formation of a domestic middle class, which would ensure a significant share of the effective demand on the domestic market. Modern economic theory supports the idea that income inequality has a negative impact on economic development, causes market failures and increases economic imbalances between demand and supply or between production and consumption.

Increasing income inequality shortens the period of economic growth and even slows economic growth through its impact on human capital. This is caused by the fact that low incomes limit people's access to quality education (including labor market integration) and consumer goods. Income inequality has a negative impact on personal consumption, causing a decrease in aggregate demand and economic growth.

As for the political consequences of income inequality, they are related to the fact that general social discontent, if this imbalance is manifested on a large scale, can facilitate the emergence of political instability. According to Malkina, this is especially true for developing countries. First, the social consequences of income inequality are related to the strengthening of social stratification. Second, the level of inequality has an impact on the mood of society. Inequality can reduce the sense of justice, which can lead to low morale and ultimately low worker productivity.

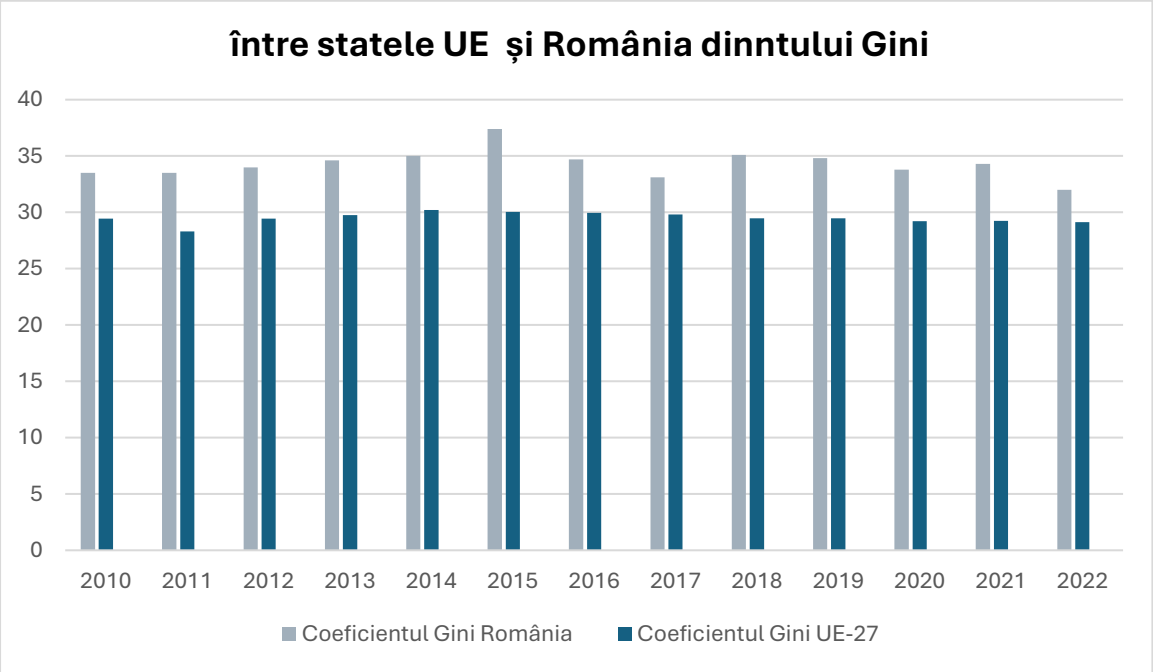
Inequalities in health are caused by income inequality. Chronic disease and disability disproportionately affect the poor. Inequality in education is caused by income disparities. People with higher incomes are more likely to receive a high-quality education and acquire the skills needed to obtain high-paying jobs and maintain their wealth. Consequently, significant disparities in life opportunities are caused by income inequality. This is true in both rich and poor countries, and affects both rich and poor people.

Chapter 2: Comparative analysis of income inequality. Case study RO vs EU-27

2.1. The dynamics of income inequality in Romania from a European perspective

In figure 1 we presented the evolution of income inequality between the EU states and Romania from the perspective of the Gini coefficient. We can observe that in 2022, the Gini coefficient was higher by 2.87 points in Romania than in the EU, which reflects a greater inequality between incomes at the level of Romania than that specific to other EU member states. The graph also shows the persistence of inequality over the last 13 years, the Gini coefficient, reducing by only 0.3 points at the EU-27 level, while in the case of Romania it decreased by 1.5 points during this period.

Figure II.



Source: author's processing using Eurostat data

Figure II shows the percentage of income obtained by the poorest 40% of the population, where we can see that in 2015 Romania had the lowest percentage of 16.8 compared to the EU, which in the same year had a percentage of 20.6, resulting in Romania having a high income inequality in 2015.

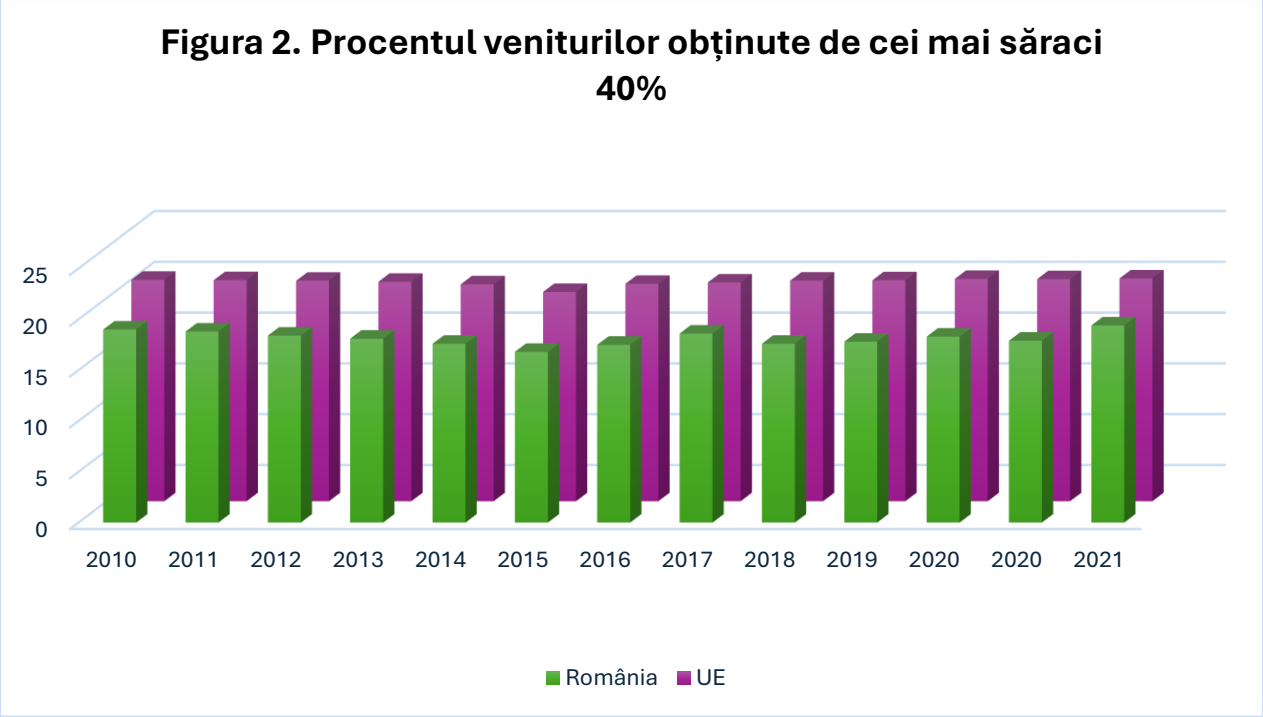


Figure III. Source: author's processing using Eurostat data

According to figure III, it is observed that Bulgaria has the highest Gini coefficient after social transfers, i.e. increased inequality in all years, and the lowest coefficient is observed in Slovakia. Social transfers are well implemented by European states through complex systems that include pensions, unemployment benefits, social benefits and other types of financial assistance for disadvantaged groups. There are several sources of funding for these transfers, such as taxes and social contributions. In addition, European states help to reduce poverty and social inclusion through vocational training programs, access to health services and social housing. At the same time, European states are adopting policies to promote participation in the labor market and supporting families, such as subsidies for childcare and care for the elderly or disabled. Therefore, European states aim to ensure a minimum standard of living and reduce social inequalities by combining social transfers with measures to support and stimulate employment.

Figure 4 shows the GDP per capita in euros at the level of the European Union. In 2010 Luxembourg has a GDP of 83,650, followed by Denmark with 43,840 and the Netherlands (38,470). At the pole of the lowest GDP 2010 is Bulgaria with 5,080 and Romania (6,340) and Latvia (8,550). In 2022, a GDP of 118,710 is registered by Luxembourg, in second place is Ireland (98,990), and the lowest GDP is in Bulgaria (13,270), with Romania not far behind with a GDP of 14,920.

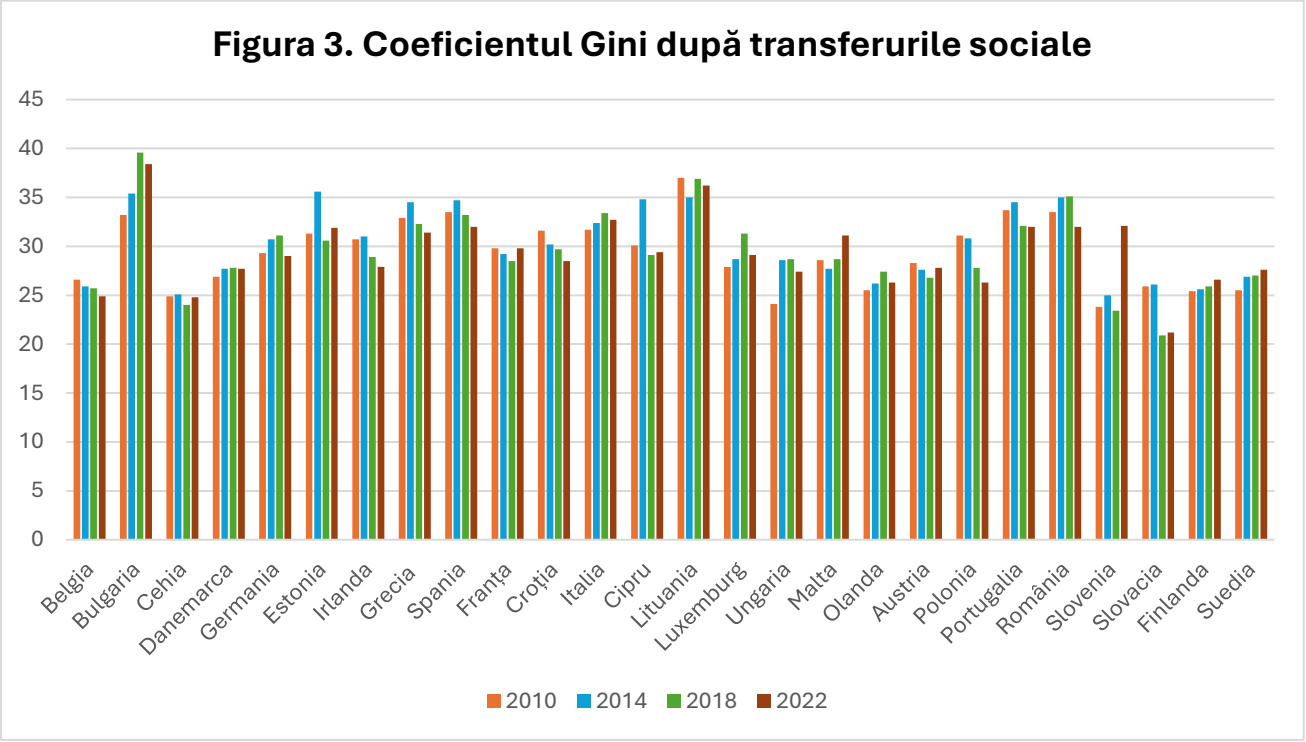
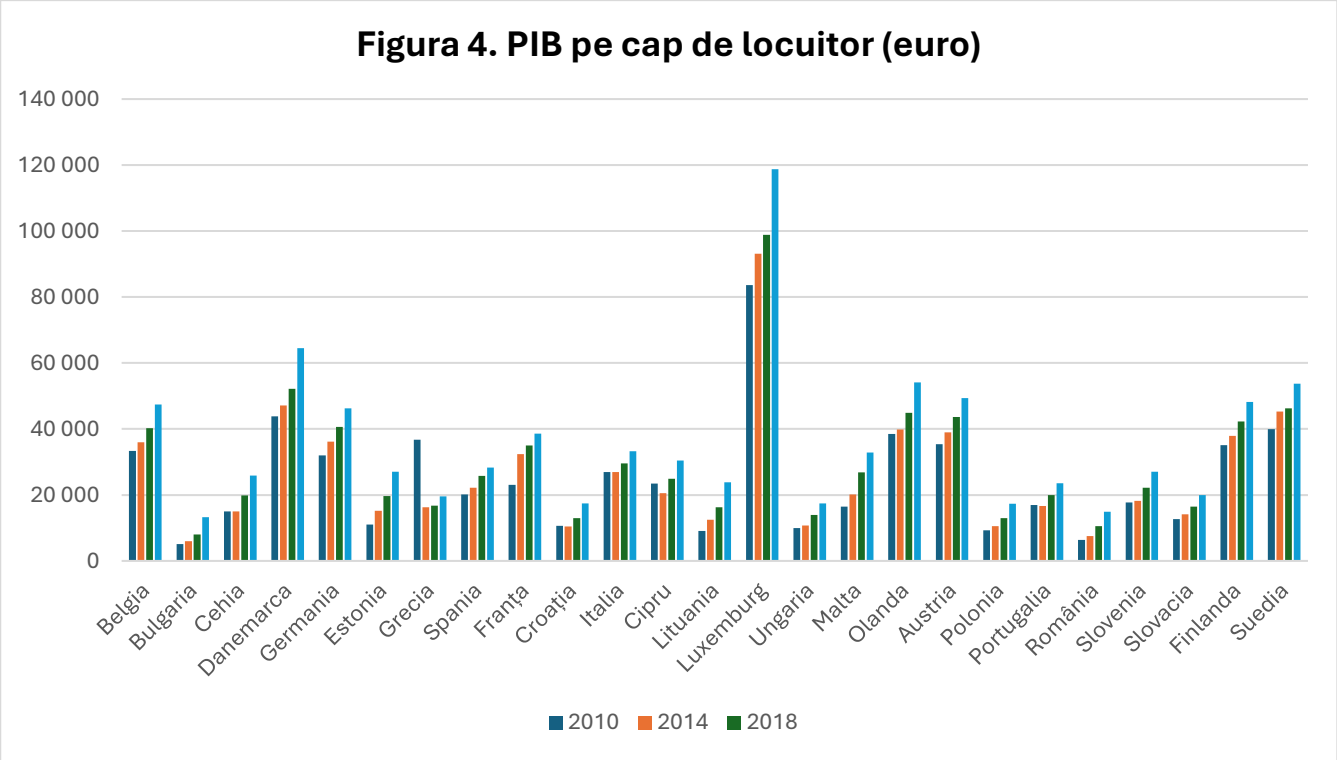


Figure IV. Source: author's processing using Eurostat data



The percentage of gross domestic product (GDP) per capita is an indicator that, if evaluated in comparison with the EU-specific value, indicates convergence with the European Union in terms of economic development. In figure 5 it can be seen that Luxembourg has the

highest GDP in 2014 (349%) followed by Denmark (177.2) and Sweden (176.9) compared to Bulgaria which in the same year has the lowest GDP (22.4%). At the same time, Romania is not far from Bulgaria with a percentage of (28.4%).

Figura 5. Procentul PIB-ului pe cap de locuitor în PIB-ul pe cap de locuitor raportat la nivelul UE-27

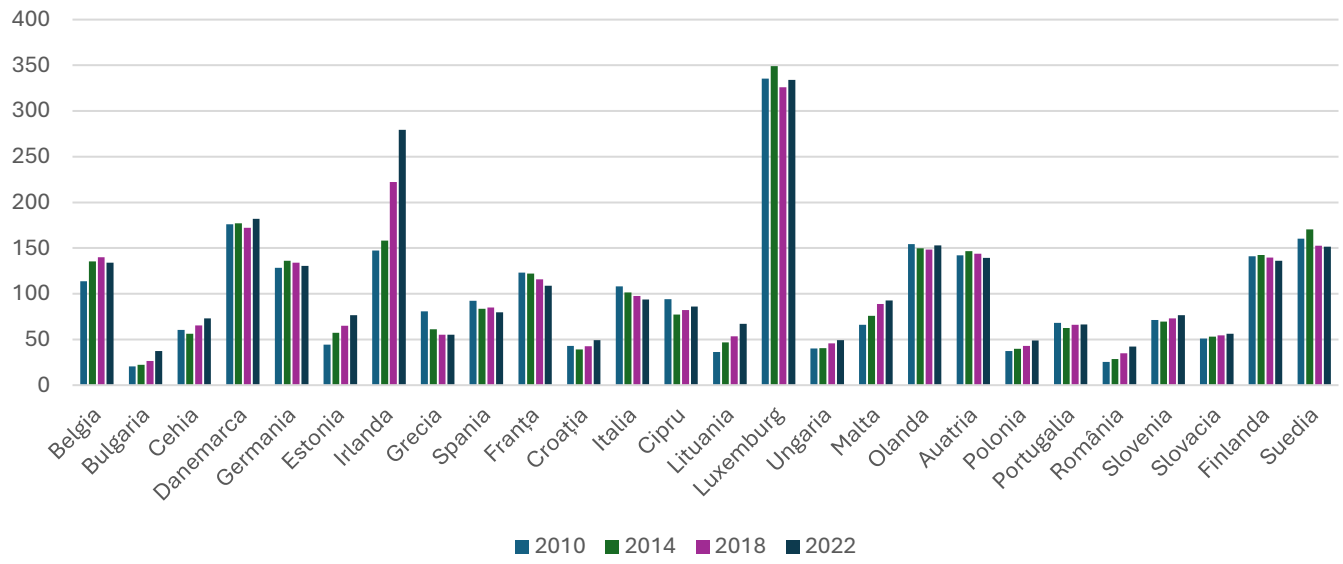
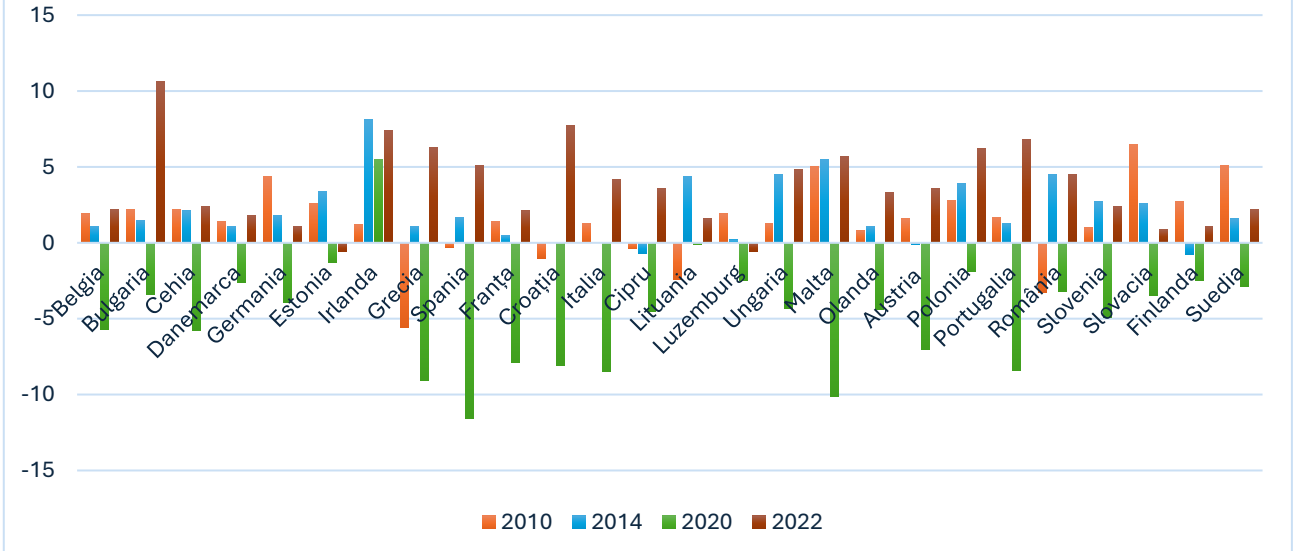


Figure V.Source: author's processing using Eurostat data

Figure 6 shows the percentage change in real GDP per capita in the European Union, where we can see that the year 2020 includes negative values, except for Ireland with a

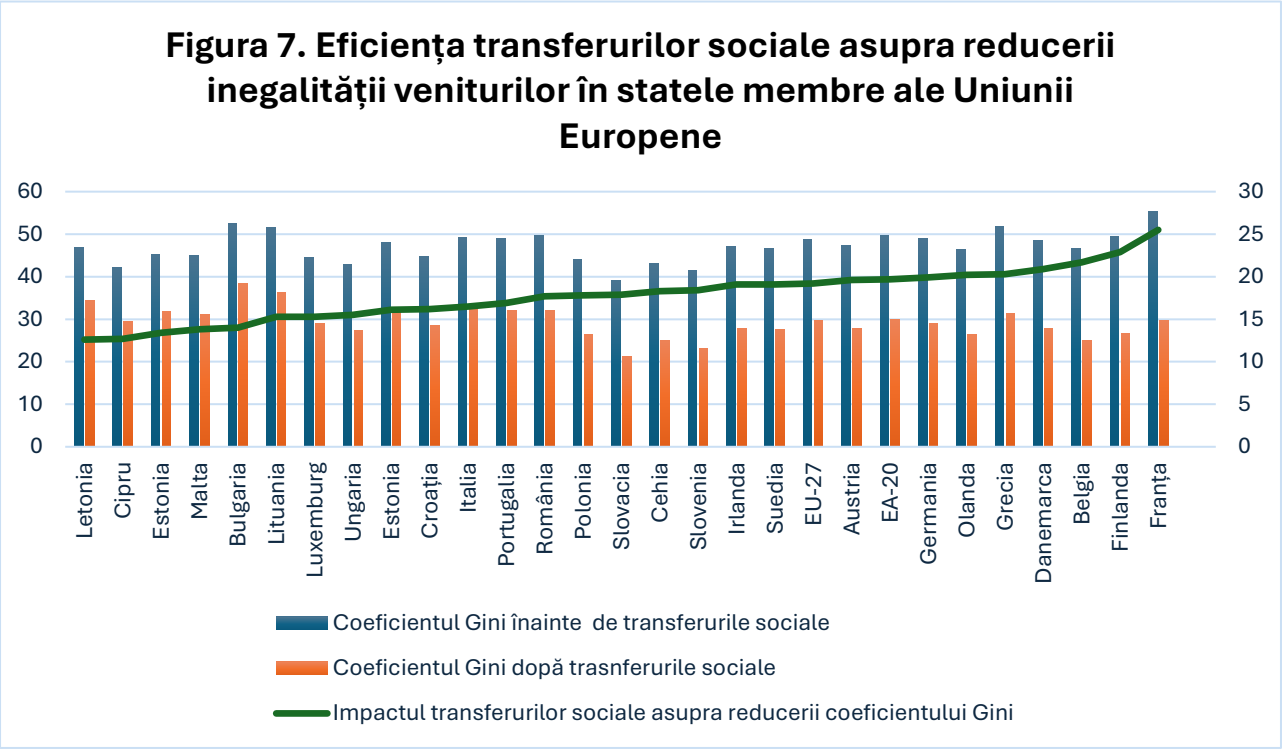
Figura 6. Modificarea procentuală a PIB-ului real pe cap de locuitor



percentage of 5.5%. The rest of the states have a negative percentage as a result of the pandemic that had a great impact on the countries, affecting the world economy.

Figure VI. Source: author's processing using Eurostat data

Also, in 2022, most of the states managed to recover from an economic point of view, Bulgaria registering a real GDP growth rate per capita of 10.6%, followed by Croatia with 7.7% . On the other hand, in the case of Estonia (-0.6%) and Luxembourg (-0.6%) there were



decreases in real GDP per capita.

Source: author's processing using Eurostat data

As can be seen in figure 7, Latvia, Cyprus and Estonia had the lowest level of efficiency in terms of social transfers. The Gini coefficient decreased by 12.6 points, 12.7 points and 13.4 points as a result of social transfers, while in Romania, it decreased by 17.7 points. In contrast, Belgium, Finland and France managed to reduce the Gini coefficient by 21.7 points, 22.9 points and 25.5 points as a result of social transfers.

2.2. Analysis of the relationship between income inequality and economic development

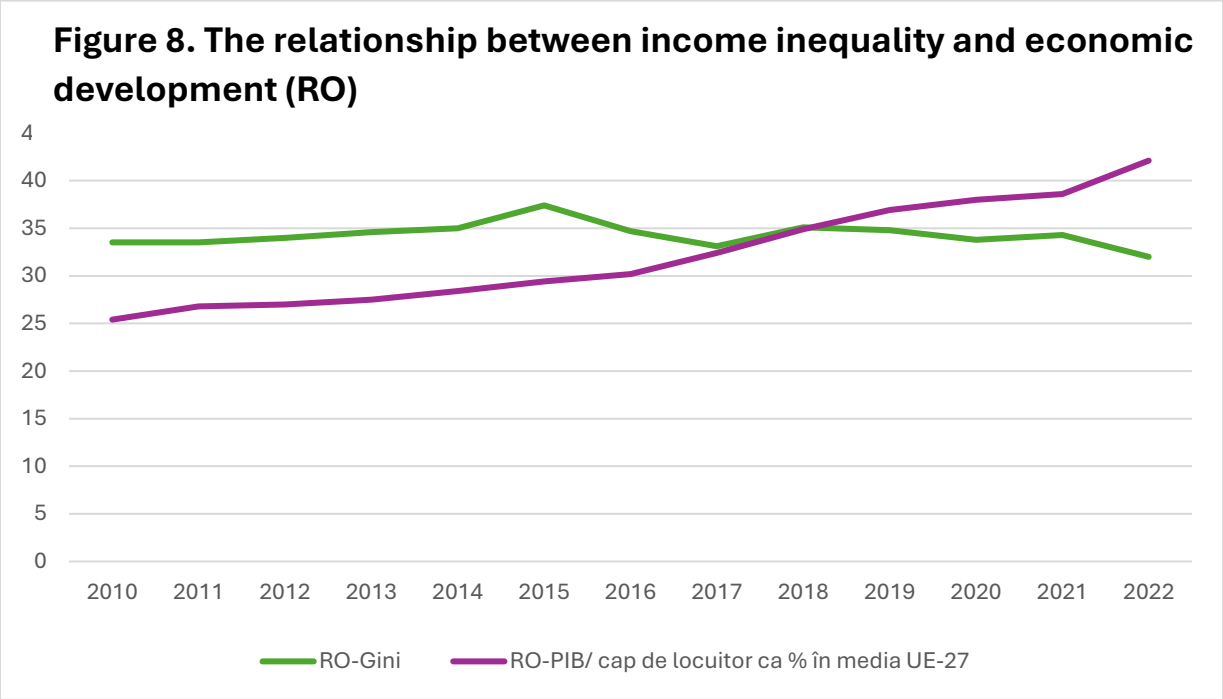


Figure VIII. Source: author's processing using Eurostat data

According to figure 8, we can observe the inverse relationship between the level of income inequality and economic development, observed in the case of Romania. The graph suggests that a decrease in income inequality causes an increase in the share of GDP per capita recorded in Romania in that of the EU, which highlights the fact that reducing income inequality can increase economic convergence between Romania and the EU.

Conclusions

Income inequality is a hot topic in contemporary economic, social and political discussions. It develops as a result of a variety of factors, including disparities in wages, labor productivity, the position occupied in the economic market, and the demographic and social characteristics of individuals. Moreover, inequality can be influenced by other variables, such as the effectiveness of income redistribution policies, the level of employment or unemployment, and the interconnections of national economies with the demands of the global economy. This discrepancy in income can slow down the overall rate of economic growth and development, having the potential to affect the social and economic balance of a society. Therefore, the priority objective of many countries is to reduce this inequality and strengthen social and economic cohesion. In this sense, the implementation of social and economic policies aimed at reducing and maintaining inequality at reasonable levels requires a deep understanding of the causes and factors that determine it, as well as its relationship with economic and social growth processes. Research on income inequality can be improved by using more accurate methods of data collection and analysis, including current data and diverse sources. It is also important to properly assess the impact of different socio-economic policies on inequality.

Transparent communication of results and involvement of stakeholders improves understanding and addressing issues.

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CROSS-BORDER E-COMMERCE, DIGITAL FINANCE AND ECONOMIC RESILIENCE

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Abstract: *This paper uses panel data of 259 prefecture-level cities in China from 2011 to 2022, and applies the double-difference method to explore the specific role and influence path of cross-border e-commerce on the economic resilience of cities. The results show that cross-border e-commerce can enhance urban economic resilience. The mechanism effect shows that cross-border e-commerce enhances the economic resilience of cities by promoting the level of digital financial development, including the breadth of digital financial coverage, depth of use and activity. The heterogeneity study finds that cross-border e-commerce can enhance the economic resilience of cities with higher administrative rank, larger population size and outflow, non-resource-based, non-growth-based and non-mature cities. The findings provide a basis for cross-border e-commerce to promote stable economic development.*

Keywords: *cross-border e-commerce; digital finance; economic resilience; double difference*
JEL*: F01; F02; F42*

1. Introduction

The global economy is undergoing a significant shift unseen for a century. External factors, like new trade protectionism and "anti-globalization" sentiments, have amplified macroeconomic volatility. Consequently, fostering economic resilience is important to ensuring the steady advancement and quality growth of China's economy. In this context, boosting economic resilience is pivotal for China's economy's steady and superior

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development. China's cross-border e-commerce has flourished recently. The General Administration of Customs declared that China's total cross-border e-commerce imported and exported volume surged to RMB 2.37 trillion in 2023, reflecting an impressive year-on-year advance of 15.3%. Concurrently, cross-border e-commerce provides opportunities to enhance economic resilience by proactively responding to international risk changes with an open trade model. Understanding the role of cross-border e-commerce in promoting economic resilience can unlock its potential.

Existing studies have only demonstrated the role of cross-border e-commerce in enhancing economic resilience, but have not investigated the mechanism between the two. For example, Wang & Wang (2024) found that cross-border e-commerce enhances the economic resilience of cities by utilizing its trade advantages such as facilitation, low cost, and high efficiency with spatial spillover effects. In the digital era, digital finance plays an important role in cross-border e-commerce trade (Goldberg et al., 2010) and is also an important influence on economic resilience (Decai et al., 2024). Previous literature lacks an in-depth discussion of the relationship between cross-border e-commerce, digital finance and economic resilience.

This article employs China's comprehensive pilot zone for cross-border e-commerce as a natural experiment, leveraging panel data from 2011-2022 across 259 Chinese prefecture-level cities to substantiate the enhancing effect of cross-border e-commerce on economic resilience via digital finance. Furthermore, it examines the differentiated effect of cross-border e-commerce on the economic resilience of various city types. The marginal contributions of this paper are: (1) From the research perspective, this paper proves that cross-border e-commerce can enhance the economic resilience of cities by promoting the development of digital finance, which expands the research scope of economic resilience to a certain extent. (2) In terms of research content, this paper analyzes the direct effect of cross-border e-commerce on the economic resilience of cities, and carries out a detailed heterogeneity analysis based on the administrative level of cities, demographic characteristics, and types of resources, so as to provide detailed empirical evidence for the implementation of China's cross-border e-commerce comprehensive pilot zones policies in different types of cities.

The rest of the paper is structured as follows: Part II reviews the previous literature and summarizes the academic contributions of this paper. The third part provides a mechanism analysis. The fourth part introduces the econometric model and data description; the fifth part presents the empirical results and analysis. The sixth part is the results of mechanism test; the seventh part is the results of heterogeneity analysis. The eighth part is the conclusion and recommendation of this paper.

2. Literature review

2.1. Economic resilience

The current literature on economic resilience focuses on three aspects: concept, measurement and influencing factors. The first is the concept of economic resilience. The concept of economic resilience was first proposed by Reggiani (2002), which refers to the ability of an economic system to resist and recover from shocks. Martin (2012) explains economic resilience in terms of disaster and post-disaster, i.e., the ability to integrate internally and adapt to external environments as well as resisting shocks when subjected to shocks. The Second is a measure of economic resilience. Briguglio (2009) and others proposed a multidimensional economic resilience composite index to empirically analyze macroeconomic stability, social development, microeconomic market efficiency and economic governance. Single-indicator measures are mainly measured by employment, unemployment and real GDP changes. For example, Martin (2015) uses the employment indicator to measure economic resilience, and he argues that the percentage decline in employment is greater than the percentage decline in output during a recession. Davies (2011), Brakman et al. (2015) measure economic resilience by combining two types of data: the number of unemployed and GDP. Thirdly, the influencing factors of economic resilience. Brown & Greenbaum (2017) use the data of Ohio counties in the U.S., and the study points out that the diversification of industrial structure can enhance the economic resilience; Bristow & Healy (2018) use the data of 28 countries in the European Union, and point out that the ability to innovate can withstand the shocks caused by the economic crisis; Boschma (2015) pointed out that innovation not only enhances the buffer capacity of industries to cope with shocks, but also strengthens the restructuring and renewal capacity of the economy during the recovery period. The studies of Christopherson et al. (2012) and Di Caro (2017) showed that factors such as market size and human capital also have an impact on economic resilience. In recent years, with the advent of the digital era, digital finance has also emerged as a key factor influencing economic resilience.

2.2. Cross-border e-commerce

Contemporary research on cross-border e-commerce predominantly examines its impact on global trade. This technology offers a real-time information management system for both transactional parties, facilitating seamless business interactions (Malone et al., 1987). Costs are primarily attributed to market information acquisition in the exporting nation, and the convenience of cross-border e-commerce decreases search time (Broocks & Biesebroeck, 2017), thereby reducing trade expenses and boosting trade volumes. Unlike traditional trade, cross-border e-commerce overcomes geographical constraints (Lendle et al., 2016), leading to the "long-tail effect" of customization and expanding product variety. It also enhances

export product quality by augmenting enterprise productivity, R&D investment, imported product categories, service inputs, and promoting service trade and product market demand (Munch & Schaur, 2018), thereby stimulating national economic growth (Guo et al., 2018).

2.3. Cross-border e-commerce and economic resilience

The significance of cross-border e-commerce in propelling economic resilience is undeniable. Comprehensive cross-border e-commerce pilot zones implement various innovations in institutions, management, and services, enhancing city innovation capability and resilience against external disturbances (Bristow & Healy 2018). Facilitated cross-border e-commerce overcomes the limitations of trade subject locations and spaces (Kim et al., 2017), expanding market capacity and realizing scale effects, thereby bolstering the resilience of the trade sector and the city economy as a whole, ultimating in the enhancement of economic resilience (Christopherson et al., 2012).

2.4. Digital finance and economic resilience

Digital finance contributes significantly to economic resilience in the digital era. Yang et al. (2024) underscore that digital finance boosts the economy's resilience, adaptability and adjustments. Sara (2011) discovered that digital finance enhances financial inclusion via credit and digital payment products, thereby bolstering the economic system's risk resistance. Hou et al. (2023) suggest that digital finance impacts economic resilience by enhancing capital allocation efficiency, strengthening innovation capacity, and stimulating residents' consumption. Wu (2023) found that digital finance and green innovation synergistically enhance the city's economic resilience. Decai et al. (2024) further confirm a significant positive correlation between digital finance and economic resilience.

3. Mechanism Analysis

Cross-border e-commerce amplifies market size and participant base through digital tech and network platforms, incentivizes enterprise innovation, elevates trade efficiency and convenience, thereby fortifying urban economy resilience, adaptability, and recovery. Firstly, it enables enterprises and products to circumvent geographical boundaries via global marketplace linkage, mitigating single market risks and augmenting economic stability against external adversities. When regional or market economic fluctuations arise, cross-border e-commerce firms can swiftly alter their market strategies and pivot to alternative markets, ensuring steady economic progression. Secondly, these firms necessitate continuous R&D investment to sustain global market competitiveness, adopt innovative technologies and tools to enhance operational efficiency and service quality, thereby bolstering the enterprises' adaptability in international trade, thereby enhancing the city's overall adaptability. Lastly, the flexibility and innovation of cross-border e-commerce enable

enterprises to rebound swiftly from economic hardships, invigorate market vitality and stimulate economic growth through the introduction of novel products, technologies, and models.

Hypothesis 1: Cross-border e-commerce can enhance urban economic resilience.

Cross-border e-commerce affects the breadth of digital financial coverage by expanding market size, thereby enhancing urban economic resilience. First, cross-border e-commerce expands the market scale of digital finance by providing convenient online payment and settlement services, enabling digital financial services to reach a wider range of regions and users, and increasing the breadth of digital financial coverage. Second, cross-border e-commerce promotes the construction of digital financial infrastructure to serve a wide range of enterprises, thus expanding the participating subjects, which directly affects the coverage of digital financial services. The breadth of digital financial coverage affects the overall operational stability of the economy, thereby enhancing the resilience of the city's economy. Finally, cross-border e-commerce itself has a significant entrepreneurial effect, which can effectively promote enterprise entry through channels such as reducing financing constraints and administrative burdens, expanding overseas cooperation (Alder et al., 2016; Tian & Xu 2021), effectively reducing the cost of services to the main body of the financing, thus meeting the long-term demand for financial services of urban SMEs and other long-tail customer groups, and providing the urban economy to cope with risky shocks to provide a wider range of financial support and enhance the resilience of the urban economy.

Hypothesis 2: Cross-border e-commerce enhances urban economic resilience by promoting the breadth of coverage of digital finance.

Cross-border e-commerce amplifies digital financial utilization through cultivating dynamic firm innovations, thereby enhancing city economic resilience. With rapid cross-border e-commerce expansion, service product transaction scales expand, and financial services budge into the cross-border e-commerce service sector. To gain economic leverage, companies employ digital technology to thoroughly comprehend buyers' shopping inclinations, preferred choices, and specific needs, thereby innovating personalized and diverse marketing tactics and intensifying digital financial services. This has also propelled the depth of digital finance usage, thereby bolstering the city's economic resilience. Financial institutions have also expedited trade finance and product innovation to offer credit services tailored for cross-border e-commerce requirements, thereby stimulating the depth of their digital finance usage. This not only boosts the competitiveness of firms and financial institutions, but also augments the resilience and innovation of the city as a whole. For instance, the digital RMB streamlines the payment process, making it more cost-effective

and secure. This innovative payment method escalates the depth of digital finance usage and fortifies the city's economic resilience.

Hypothesis 3: Cross-border e-commerce can enhance urban economic resilience by affecting the depth of digital finance.

Cross-border e-commerce affects digital financial activity by improving trade efficiency, thereby enhancing urban economic resilience. On the offline side, cross-border e-commerce accelerates the agglomeration of cross-border e-commerce industry chain and supply chain by providing enterprises with offline parks, forming a more complete supply chain and ecosystem covering manufacturing, trading, payment, logistics, warehousing, and technology, which improves transaction efficiency. The improved transaction efficiency makes enterprises more active in the field of digital finance. Cross-border e-commerce improves the operational efficiency of trade logistics, enhances the response and matching acumen of production factors, realizes the interconnection and efficient sharing of regional factor resources, and thus enhances the activity of digital finance. On the online side, the construction of cross-border e-commerce platforms can avoid the risks brought about by false trade financing, and also improve the diversification of financing channels, helping SMEs to solve financing problems (Tadelis, 2016). When the financing problem is effectively solved, enterprises are more willing to utilize cross-border e-commerce for trade, which effectively promotes the overall digital financial activity of the city. The enhancement of digital financial activity enables financial institutions to respond quickly to market financial demands and provide high-quality financial services to market players when the city faces risky shocks, enhancing the city's economic resilience.

Hypothesis 4: cross-border e-commerce enhances the city's economic resilience by affecting digital financial activity.

4. Research design

4.1. Benchmark regression model

In order to examine the impact of cross-border e-commerce on the economic resilience of Chinese cities, this paper sets up the following regression model:

$$Resilience_{it} = \alpha_0 + \beta did_{it} + \sum \gamma X_{it} + \delta_i + \sigma_t + \mu_{it}$$

where $Resilience_{it}$ is the economic resilience of city i in year t; did_{it} is a dummy variable for the comprehensive cross-border e-commerce pilot zone (cross-border e-commerce belongs to the proxy variable of this policy), where $did_{it} = 1$ indicates that the city belongs to the comprehensive cross-border e-commerce pilot zone city, or else 0; X_{it} denotes the

control variable; and α_0 is a constant term; and β is the average effect of cross-border e-commerce on the economic resilience of the city, which is also the the main research variable of this paper; γ denotes the coefficient of the control variable; δ_i and σ_t is the individual fixed effect and time fixed effect; μ_{it} is the random perturbation term.

4.2. Mediation effect model

Based on the above analysis, this paper considers that cross-border e-commerce may enhance the city's economic resilience by promoting the city's digital financial development level. Therefore, the mediation effect test model is constructed as follows:

$$Intermediary_{it} = \alpha_1 + \beta_1 did_{it} + \sum \gamma X_{it} + \delta_i + \sigma_t + \mu_{it}$$

$$Resilience_{it} = \alpha_2 + \beta_2 Intermediary_{it} + \sum \gamma X_{it} + \delta_i + \sigma_t + \mu_{it}$$

where $Intermediary_{it}$ denotes the mediating mechanism variable in this paper, β_1 denotes the average impact effect of cross-border e-commerce on the mediating mechanism variable, β_2 denotes the average impact effect of the mediating mechanism variable on the economic resilience of the city. If β_1 and β_2 are both significantly positive, the mediating mechanism effect exists.

4.3. Heterogeneity model

Recognizing that the role of cross-border e-commerce in enhancing the economic resilience level of cities might be affected by factors such as city class, demographics, resource availability, etc., we kindly introduce a cross-multiplier term of differentiation factors and did into our model, constructed based on the benchmark regression:

$$Resilience_{it} = \alpha_3 + \beta_3 did_{it} * Diff_{it} + \sum \gamma X_{it} + \delta_i + \sigma_t + \mu_{it}$$

$Diff_{it}$ indicates the differential factors such as whether it is a provincial capital city, a central city, a large or medium-sized city, etc., and β_3 indicates the average impact effect of cross-border e-commerce on the improvement of the level of economic resilience of the city under different conditions. The names of the remaining variables are consistent with the benchmark regression model.

4.4. Variable selection and measurement

The explanatory variable is economic resilience. For the measurement of economic resilience, drawing on Martin et al. (2015) and others, the financial crisis of 2008 is regarded as an exogenous shock, and by comparing the real GDP of the city after the shock from the national real GDP to measure the level of economic resilience of the city is calculated using the following formula:

$$RE_{it} = \frac{City\ GDP_{it} - City\ GDP_{2008}}{City\ GDP_{2008}}$$

$$GR_t = \frac{Nation\ GDP_t - Nation\ GDP_{2008}}{Nation\ GDP_{2008}}$$

$$Resilience_{it} = \frac{RE_{it} - GR_t}{GR_t}$$

The core explanatory variable is cross-border e-commerce (did). Construct the cross-border e-commerce integrated zone policy variable, which is 1 if the city implements the policy in that year and thereafter, and 0 otherwise. Considering the potential impacts brought by other factors on the robustness of the empirical results, a series of control variables are selected in this paper. These include fiscal self-sufficiency (fiscal revenue/fiscal expenditure), consumption dynamism (total retail sales of consumer goods/GDP), market size (total merchandise sales of wholesale and retail trade above the quota/GDP), financial activeness (end-of-year financial institutions' loan and deposit balances/GDP), industrial structure (tertiary industry value added/secondary industry value added), educational environment (education and technology expenditures/fiscal expenditures), Science and Technology Emphasis (Science and Technology Expenditure/Fiscal Expenditure).

The mediator variable employs the comprehensive digital finance index provided by the esteemed Digital Finance Research Center at Peking University, China, to encapsulate the general level of digital finance. This index considers three facets: digital finance's scope, usage, and vibrancy. The scope indicates digital finance's reach; the usage captures how it's currently employed by users; while the vibrancy symbolizes its degree of digitization.

4.5. Data sources and descriptive statistics

This study utilizes 259 Chinese provincial capitals from 2011 to 2022, excluded those with excessive missing values. All individual missing data were reassigned via linear interpolation. The primary data is sourced from China's Digital Finance Research Center at Peking University, China Urban Statistical Yearbook, China Urban Construction Statistical Yearbook, China Science and Technology Statistical Yearbook, and respective city government's official data and statistical bulletins. Table 1 presents the descriptive statistics of key variables.

Table 1 Descriptive statistics

		(1)	(2)	(3)	(4)	(5)
	Variables	N	mean	sd	min	max
Core explanatory variables	Cross-border e-commerce	3108	0.136	0.343	0	1
Explanatory variable	Resilience	3108	24.200	24.800	-11.450	161.400
Control variable	Govern	3108	0.467	0.214	0.072	1.541
	Consume	3108	0.388	0.107	0	1.013
	Market	3108	0.462	0.441	0.004	4.697
	Finance	3108	0.703	0.226	0.060	5.613
	Structure	3108	1.063	0.586	0.175	5.650
	Education	3108	0.176	0.039	0.044	0.356
	Science	3108	0.018	0.018	0.001	0.207
Intermediary variable	Breadth of digital financial coverage	3108	195.100	76.100	21.260	361.100
	Depth of use of digital finance	3108	189.400	80.400	4.490	392.800
	Digital Financialization Activity	3108	226.500	83.760	2.700	437.900

5. Empirical results and analysis

5.1. Benchmark regression

Table 2 presents the outcomes of benchmark regressions. Columns (1) and (2) illustrate the outcomes of random effects models without and with control variables, revealing that both Cross-border e-commerce's impact on economic resilience is significantly positive. Columns (3) and (4) incorporate individual and time double fixed effects into models (1) and (2), respectively, and despite a decrease in Cross-border e-commerce's estimated coefficient, it remains significantly positive. These results confirm that cross-border e-commerce significantly supports urban economic resilience, regardless of the model employed or inclusion of control variables. Hypothesis 1 is validated, demonstrating that cross-border e-commerce bolsters urban economic resilience.

Table 2 Benchmark regression results

	(1)	(2)	(3)	(4)
Variables	Resilience	Resilience	Resilience	Resilience
Cross-border e-commerce	32.010***	22.500***	4.967***	3.710**
	(1.222)	(1.281)	(1.819)	(1.559)
Constant	19.830***	21.210***	3.978***	-25.130***
	(0.600)	(3.385)	(0.546)	(5.824)

Control	NO	YES	NO	YES
Individual fixed effect	NO	NO	YES	YES
Time fixed effect	NO	NO	YES	YES
Observations	3,108	3,108	3,108	3,108
R-squared	0.786	0.820	0.786	0.820
Number of id	259	259	259	259

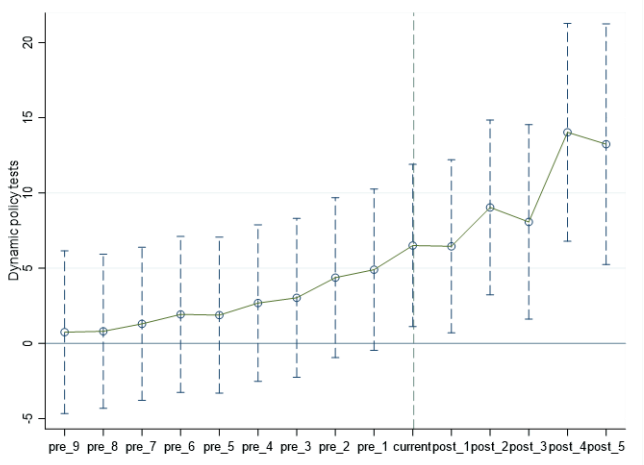
*Note: *, **, and *** denote significant at the 10%, 5%, and 1% levels, respectively; clustered robust standard errors are in parentheses, as in the table below.*

5.2. Robustness test

5.2.1.Parallel trend test

We carefully craft the interaction term linking the city to the dummy variable across each year in the parallel trend test, evaluating the parallel trend test's acceptance based on the apparent significance of the regression coefficients each year. Figure 1 elegantly illustrates the parallel trend test concerning the influence of cross-border e-commerce on urban economic resiliency, with the dashed line demarcating the year of the implementation of the comprehensive pilot zone policy for cross-border e-commerce. Results illustrate that the regression coefficients prior to this policy implementation were insignificant, suggesting no notable difference in the influence bore by city groups under the comprehensive pilot zone versus non-comprehensive pilot zone on city economic resiliency. However, following this policy shift, we observe markedly higher economic resilience among comprehensive pilot zone cities compared to their counterparts. This effect persists and exhibits lasting impacts even over many years of implementation. Hence, our research sample successfully meets the parallel trend test criteria. These results suggest that cross-border e-commerce can indeed bolster city economic resiliency.

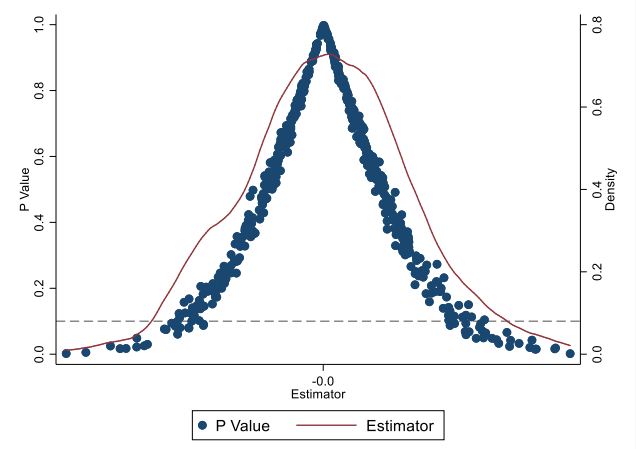
Figure 1 Parallel trend test



5.2.2.Placebo test

To ensure our findings aren't swayed by unknown variables. Our system has randomly generated policy shocks for 500 iterations. As seen in Figure 2, the regression coefficients of our pseudo-core explanatory variables are mostly close to zero and display a normal distribution pattern, not overlapping with the coefficient of 3.710 from our baseline regression. Most P-values for these coefficients also fall above the 0.1 threshold, affirming that, generally, our regression results do not attain statistical significance (significantly higher than 10%). Thus, the comprehensive cross-border e-commerce pilot zone policy seems untroubling to the city's economic resilience and poses only minimal effects on the baseline regression results.

Figure 2 Placebo test



5.2.3.Lag effect test

In light of the potential endogeneity issue associated with the time gap of the cross-border e-commerce comprehensive pilot zone policy, this study employs a lagged effect of 1 and 2 years to analyze the policy variables. The findings are presented in Table 3, with columns (1) and (2) presenting the effects of a 1-year lag without and with control variables respectively. A notable finding is that the coefficient of L. did on Economic resilience is significant at 5%, without control; it remains significant at 3.652 after control. Column (3) underscores the fact that after a 2-year lag, with no control, the policy impact is significant at 1%, with a coefficient of 4.809. Column (4), which includes control variables, shows a significant result at 5% with a coefficient of 3.646. In summary, the policy's delay effect intensifies with time and persists robustly after control, aligning well with the benchmark regression's conclusion. This validates the significance of cross-border e-commerce in bolstering economic resilience.

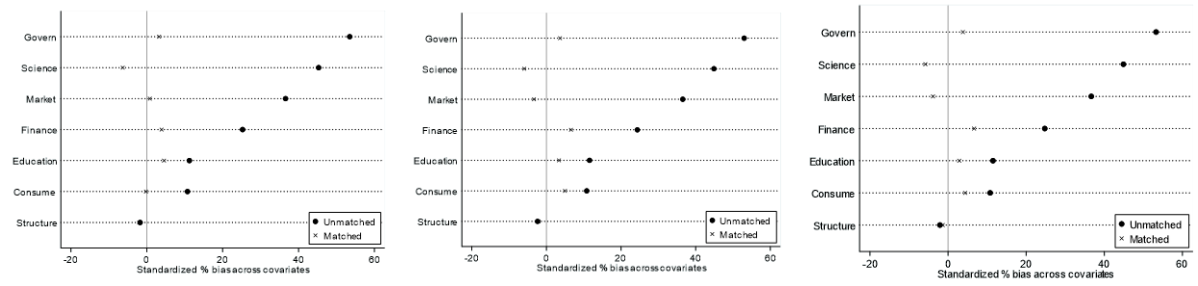
Table 3 Robustness: lag test

	(1)	(2)	(3)	(4)
	1- year lag		2-year lag	
Variables	Resilience	Resilience	Resilience	Resilience
L.did	4.728**	3.652**		
	(1.830)	(1.544)		
L2.did			4.809***	3.646**
			(1.822)	(1.571)
Constant	7.203***	-23.720***	9.271***	-25.180***
	(0.577)	(6.299)	(0.615)	(7.612)
Control	NO	YES	NO	YES
Individual fixed effect	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES
Observations	2,849	2,849	2,590	2,590
R-squared	0.780	0.815	0.778	0.813
Number of id	259	259	259	259

5.2.4.Propensity Score Matching-Double Difference (PSM-DID)

Comprehensive cross-border e-commerce pilot zones selection is not arbitrary, but determined by the government considering each city's features. This might result in notable disparity among comprehensive pilot zone cities (experimental group) and non-comprehensive pilot zone cities (control group) regarding e-commerce progress, government focus on foreign trade, and import/export scales. This disparity impairs the comparison between both groups and induces the issue of self-selection bias. To mitigate this bias, the paper employs the propensity score matching method to construct the PSM-DID model (Heckman et al., 1998). Three distinct matching methods are utilized to align the experimental group with the most similar control group based on control variables. The variance comparison before and after matching is illustrated in Fig. 3, comparing the variance of variables before and after the application of 1:1 proximity matching method, radius matching, and the kernel matching approach, respectively. The findings indicate no significant difference between the experimental and control groups post-matching, indicating a successful matching process. This suggests that the self-selection bias in the impact of cross-border e-commerce pilot zones on economic resilience has been effectively eliminated.

Figure 3 Comparison of Variance of Variables under Three Different Matching Methods



Matched data underwent regression analysis. Results are presented in Table 4, with columns (1)-(3) representing the estimated coefficients of cross-border e-commerce policies' influence on city's economic resilience post-matching via three techniques. As demonstrated, the estimated coefficients of the comprehensive pilot zone policy are markedly positive across all three methods, confirming the robustness of this paper's findings, affirming the vigorous influence of cross-border e-commerce on urban economic resilience while controlling for self-selection bias.

Table 4 Robustness: the PSM-DID test

	(1)	(2)	(3)
	close match	radius match	nuclear matching
Variables	Resilience	Resilience	Resilience
Cross-border e-commerce	21.750***	22.250***	21.950***
	(2.621)	(2.647)	(2.637)
Constant	26.190**	26.550**	26.260**
	(10.690)	(10.690)	(10.680)
Control	YES	YES	YES
Individual fixed effect	YES	YES	YES
Time fixed effect	NO	NO	NO
Observations	2444	2439	2441
R-squared	230	230	230
Number of id	0.355	0.357	0.356

5.2.5.Excluding other policy disturbances

Tables (1)-(2) of Table 5 illustrate that cross-border e-commerce significantly impacts economic resilience irrespective of control variables, and the policy of a comprehensive pilot zone for integrating science and technology with finance has no correlation with economic resilience. The estimated coefficients of cross-border e-commerce remain significant post-exclusion of

the policy of comprehensive pilot zone, signifying minimal interference from other policies during the sample observation period, thereby validating the robustness of the baseline regression results. This suggests that cross-border e-commerce can bolster the economic resilience of cities.

Table 5 Robustness: excluding policy disturbances

	(1)	(2)
Variables	Resilience	Resilience
Cross-border e-commerce	5.178***	3.876**
	(1.835)	(1.575)
Comprehensive Pilot Zone for Integrating Science, Technology and Finance	-5.810	-5.724
	(5.776)	(5.196)
Constant	4.898***	-24.38***
	(1.056)	(5.865)
Control	NO	YES
Individual fixed effect	YES	YES
Time fixed effect	YES	YES
Observations	3088	3086
R-squared	0.787	0.822
Number of id	259	259

5.2.6.Other Robustness Tests

To mitigate the effect of outliers, the explanatory variables are reduced by 5%. The municipality directly under the central government presents a substantial development advantage over others, and its inclusion may exaggerate the influence of the cross-border e-commerce comprehensive experimental zones policy on economic resilience, hence, this entity would be eliminated post-analysis. The resilient economic features exhibit distinct spatial distributional patterns, highlighting different clustering levels which could potentially induce sample variations. Therefore, altering the clustering levels could facilitate excluding these disparities. As illustrated in Tables 6, columns (1) and (6), cross-border e-commerce can bolster the economic resilience of cities.

Table 6 Other robustness tests

	(1)	(2)	(3)	(4)	(5)	(6)
	Have one's tail reduced		Excluding municipalities		Replacing the clustering hierarchy	
Variables	Resilience	Resilience	Resilience	Resilience	Resilience	Resilience

Cross-border e-commerce	3.547***	2.511**	3.588***	2.293**	3.588**	2.293**
	(1.228)	(1.083)	(1.270)	(1.129)	(1.275)	(1.001)
Constant	3.090***	-12.01***	3.103***	-11.64***	3.103*	-11.64**
	(0.598)	(3.947)	(0.603)	(3.958)	(1.697)	(4.874)
Control	NO	YES	YES	NO	NO	YES
Individual fixed effect	YES	YES	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES	YES	YES
Observations	2798	2798	2754	2754	2754	2754
R-squared	0.816	0.845	0.816	0.845	0.816	0.845
Number of id	259	259	255	255	259	259

6. Mechanism analysis

As shown in Table 7, columns (1)-(2) are the estimated coefficients of the impact of cross-border e-commerce on the total digital financial index and the total digital financial index on the economic resilience of the city, and the results show that the two paths are all established at a significant level of 1%, and the mediating effect exists. The results show that both paths are valid at 1% significant level, and the mediation effect exists. It indicates that cross-border e-commerce can increase the economic resilience of the city by promoting the development of digital finance, i.e., the path of "cross-border e-commerce → digital finance development → economic resilience" is valid. Columns (3)-(4) are the estimates of the impact of cross-border e-commerce on the breadth of digital financial coverage and the breadth of digital financial coverage on the city's economic resilience, all of which are significantly positive. It indicates that cross-border e-commerce expands the trade market size and participating subjects, and drives the breadth of digital financial coverage, which enhances the city's economic resilience. Hypothesis 2 is established. Columns (5)-(6) are the estimated coefficients of the impact of cross-border e-commerce on financial digitalization activity, financial digitalization activity on urban economic resilience, and Cross-border e-commerce, and the coefficients indicate significantly positive. It indicates that cross-border e-commerce can enhance the city's economic resilience by promoting the depth of digital financial use, and Hypothesis 3 holds. Columns (7)-(8) are the estimated results of the role of cross-border e-commerce policy on the impact of the degree of financial digitization and the impact of digital financial activity on the city's economic resilience, and both paths are significantly positive at the 1% level of significance, which indicates that cross-border e-commerce can enhance the city's economic resilience through the promotion of digital financial activity, and Hypothesis 4 is valid.

Table 7 Mechanism analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total Digital Finance Index		Breadth of digital financial coverage		Depth of use of digital finance		Digital Financial Activity	
Variables	Intermediary	Resilience	Intermediary	Resilience	Intermediary	Resilience	Intermediary	Resilience
Cross-border e-commerce	3.840***		1.425*		4.710***		10.23***	
	(0.755)		(0.832)		(0.980)		(1.768)	
Intermediary		0.442***		0.344***		0.210***		0.0540***
		(0.068)		(0.067)		(0.047)		(0.017)
Constant	45.090***	45.030***	44.880***	40.540***	52.090***	36.010***	33.080***	26.870***
	(3.047)	(6.278)	(3.636)	(6.534)	(3.602)	(6.194)	(7.226)	(5.852)
Control	YES	YES	YES	YES	YES	YES	YES	YES
Individual fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
Observations	3108	3108	3108	3108	3108	3108	3108	3108
R-squared	0.995	0.828	0.994	0.826	0.990	0.823	0.964	0.820
Number of id	259	259	259	259	259	259	259	259

7. Heterogeneity analysis

7.1. Heterogeneity of demographic characteristics

Applying demographic variations among cities, cross-border e-commerce's impact on enhancing economic resilience varies. Cross-border e-commerce demands adequate human resources for optimal policy implementation, thereby augmenting city resilience. This paper classifies prefecture-level cities into two groups: large and medium-sized cities, and small cities. Results are illustrated in Table 8, where column (1) depicts that the estimated coefficient of large and medium-sized cities on economic resilience is 6.870, significantly positive at 1% significance level; column (2) denotes the non-significant coefficient of non-large and medium-sized cities on economic resilience. Policies advocate for constructing digital financial infrastructure, including enhancing network penetration and optimizing payment systems, to establish a robust foundation for cross-border e-commerce. Larger cities benefit from infrastructure improvement as it expands user reach, enhances digital finance coverage, and notably bolsters economic resilience.

Analyzed from a dynamic perspective, population mobility may cross-border e-commerce have different effects on the enhancement of economic resilience (Xie et al., 2022). In this paper, cities are categorized into inflow and outflow cities based on their resident population[5]. The results are shown in Table 8, the coefficients and significance of the interaction terms in columns (3) and (4) can be concluded that population inflow cities do not have a significant effect on the enhancement of economic resilience; population outflow cities enhance the economic resilience of the city at the 10% level, with a coefficient of 4.587. the probable reason is that population mobility affects the labor market of the city. Population outflow can reduce the employment pressure in the outgoing places, especially in areas with limited resources or insufficient employment opportunities. This helps optimize the allocation of labor resources, increase labor productivity, and enhance economic resilience. In addition, if the human capital level of the inflowing population is relatively low, in the face of external shocks, changes in population size in the short term will make it difficult to improve the structure of human capital, affecting the speed of employment recovery in the labor market and making it difficult to increase labor productivity, which will not lead to an increase in economic resilience.

Table 8 Heterogeneity: demographic characteristics

	(1)	(2)	(3)	(4)
	Large and medium-sized cities	Non-large and medium-sized cities	Influx cities	Cities with outflow of population
Variables	Resilience	Resilience	Resilience	Resilience
Interaction term	6.870***	-1.305	2.030	4.587*
	(1.983)	(2.243)	(1.784)	(2.537)
Constant	-23.68***	-24.79***	-24.77***	-25.83***
	(5.805)	(5.905)	(5.888)	(5.823)
Control	YES	YES	YES	YES
Individual fixed effect	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES
Observations	3108	3108	3108	3108
R-squared	0.822	0.822	0.819	0.820
Number of id	259	259	259	259

[5] Subtracting the year-end resident population of cities in 2020 and 2010 from the China Urban Statistical Yearbook.

7.2. Resource endowment heterogeneity

It has been demonstrated in the literature that there are differences in the economic resilience of different resource-based cities. Then, cross-border e-commerce may have different effects on the economic resilience of different resource-based cities. In this paper, cities are divided into resource-based cities and non-resource-based cities, and resource-based cities are divided into whether they are growth and maturity cities.[6] The results are shown in Table 9, columns (1) and (2) can be concluded that resource-based cities do not have a significant impact on the improvement of economic resilience; non-resource-based cities have a positive impact on economic resilience at the 1% confidence level. Non-resource cities usually have a more diversified industrial structure and are better able to utilize cross-border e-commerce platforms to expand their markets and increase exports, thus enhancing economic resilience. Resource-based cities, on the other hand, may be overly dependent on the development and export of specific resources, resulting in a single industrial structure and a weaker ability to adapt to changes in external markets. Although cross-border e-commerce provides new trade channels, it may be difficult to change the economic vulnerability brought about by their homogeneous industrial structure.

To further analyze and study the heterogeneity of resource endowment. In this paper, resource-based cities can be categorized into whether they are growing and mature cities. The results of the interaction term coefficients in columns (3)-(6) show that cross-border e-commerce is enough to promote the economic resilience of non-growing and non-mature cities, while the promotion effect for growing and mature cities is not significant. Non-growing and non-mature cities usually have a low starting point for the development of cross-border e-commerce, with a small number of enterprises, a small market size, and a relatively backward technological level. Therefore, when the comprehensive cross-border e-commerce pilot zone policy is implemented in these cities, it can quickly attract the entry of enterprises and capital, promote the rapid development of the industry, and thus be more capable of enhancing economic resilience.

Table 9 Resource endowment heterogeneity

	(1)	(2)	(3)	(4)	(5)	(6)
	resource-based city	Non-resource-based cities	growing city	Non-growth cities	Mature cities	Non-mature cities
Variables	Resilience	Resilience	Resilience	Resilience	Resilience	Resilience
interaction term	-4.030	5.720***	-9.248	3.964**	-1.854	3.964**

[6] Circular of the Chain State Council on the Issuance of the National Sustainable Development Plan for Resource-Based Cities (2013-2020).

	(3.702)	(1.594)	(5.812)	(1.570)	(5.980)	(1.570)
Constant	-25.020***	-25.080***	-24.970***	-25.090***	-25.020***	-25.090***
	(5.895)	(5.721)	(5.929)	(5.817)	(5.929)	(5.817)
Control	YES	YES	YES	YES	YES	YES
Individual fixed effect	YES	YES	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES	YES	YES
Observations	3108	3108	3108	3108	3108	3108
R-squared	0.819	0.822	0.819	0.820	0.819	0.820
Number of id	259	259	259	259	259	259

7.3. Administrative hierarchy heterogeneity

In addition to demographic characteristics and resource endowments that may make cross-border e-commerce contribute differently to economic resilience. This paper also considers the heterogeneity in the administrative hierarchy of cities. The results are shown in Table 10, with columns (1)-(2) showing the estimation results for provincial capitals and non-provincial capital cities, respectively. The results show that cross-border e-commerce is more able to enhance the economic resilience of provincial capital cities with a coefficient of 8.703. while the enhancement effect on the economic resilience of non-provincial capital cities is not significant. The reason may be that provincial capital cities usually have a stronger economic foundation, and these areas can allocate resources more effectively, including capital, talents, technology, etc., to meet the needs of the rapid development of cross-border e-commerce. At the same time, the industrial chain and supply chain systems in these regions are relatively well-developed, which helps cross-border e-commerce enterprises to reduce costs improve efficiency, and enhance the economic resilience of the cities.

To further validate the cross-border e-commerce of high administrative level cities on the city's economic resilience. This paper divides municipalities, sub-provincial cities, and provincial capitals into central cities, and other prefecture-level cities into peripheral cities, the results are shown in Table 8, columns (3) and (4) are the estimation results of central and peripheral cities, respectively. The effect of cross-border e-commerce on the economic resilience of the center city is significant, with a coefficient of 7.086, while that of the peripheral cities is not significant. The central city contains the economy of sub-provincial cities, whose regression coefficients promote economic resilience to a lesser extent than those of the provincial capital cities. It is further verified that the effect of cross-border e-commerce in promoting economic resilience is stronger in cities with higher administrative levels.

Table 10 Heterogeneity: urban class

	(1)	(2)	(3)	(4)
	provincial capital	non-provincial capital	center city	outlying city
Variables	Resilience	Resilience	Resilience	Resilience
interaction term	8.296***	0.818	7.086***	0.911
	(2.684)	(1.835)	(2.422)	(1.962)
Constant	-23.690***	-25.220***	-23.400***	-25.300***
	(5.812)	(5.892)	(5.848)	(5.877)
Control	YES	YES	YES	YES
Individual fixed effect	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES
Observations	3108	3108	3108	3108
R-squared	0.821	0.819	0.821	0.819
Number of id	259	259	259	259

8. Conclusions and recommendations

In the relentless pursuit of economic high-quality development, economic stability amidst intricate internal and external changes is paramount. This study examines the role and mechanism of cross-border e-commerce on urban economic resilience utilizing data from 259 Chinese prefecture-level cities from 2011 to 2022. Utilizing digital finance as a medium, we investigate the function of cross-border e-commerce on economic stability. We aim to extend the current literature, providing insights for fostering economic stability and high-quality growth. Our findings reveal that cross-border e-commerce enhances the development of digital finance in the city, enhancing economic resilience in three dimensions: breadth, depth, and activity. Heterogeneous analysis indicates the varied impacts of cross-border e-commerce on economic resilience according to demographic, resource, and administrative levels. Firstly, cross-border e-commerce increases economic resilience in cities with larger populations and outbound flows. Secondly, it bolsters economic resilience in non-resource-based, non-growth, and non-mature cities. Lastly, it positively influences the economic resilience of capital and center cities with higher administrative hierarchies but exhibits no effect on periphery cities.

These findings can provide a reference for different cities to enhance their economic resilience with the help of cross-border e-commerce. First, cross-border e-commerce should have a full effect on the digital finance of cities to stimulate the breadth, depth and activity of digital finance, to enhance economic resilience and promote the high-quality development of the

local economy. Second, cross-border e-commerce policies should be formulated based on the characteristics of cities to enhance economic resilience. For non-resource-based, non-growing and non-mature cities with high administrative levels, large populations and population outflows, the state should increase investment in cross-border e-commerce to ensure stable economic growth. For resource-based, growing, and mature cities with lower administrative levels and smaller populations but with an inflow trend, more attention needs to be paid to factors other than cross-border e-commerce that affect economic resilience.

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RESEARCH ON THE IMPACT OF DIGITAL RMB CROSS BORDER PAYMENT ON RMB INTERNATIONALIZATION

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Abstract: With the booming development of digital technology and digital economy, digital RMB has attracted widespread attention in various fields, and whether digital RMB cross-border payment can promote the internationalization of RMB has become one of the current research hotspots. China started the pilot program for RMB cross-border settlement in 2009, and the process of internationalization of RMB has been accelerating. However, there are still many challenges in the process of RMB internationalization, such as the development level of China's financial market, the opening level of capital account and so on. However, through the use of digital RMB for cross-border payments, it can better cope with the difficulties and challenges faced in the process of RMB internationalization. To this end, this paper takes the digital RMB cross-border payment as the guidance and analyzes its impact on the internationalization of RMB.

Key words: Digital RMB; Cross-border payment; RMB internationalization

1.Introduction

The report of the 20th CPC National Congress pointed out that accelerating the construction of digital China is an important direction for promoting the development of digital economy in the future. In order to establish a new retail payment system that is suitable for the needs of digital economy, the People's Bank of China has attached great importance to the research and development of digital RMB. In 2014, China established a research team for legal digital currency, conducting in-depth research on its issuance system, core technology, issuance and circulation environment, and foreign experience that can be learned from. In 2016, China established the "Digital Currency Research Center" and built the first prototype system of legal digital currency in China. The People's Bank of China was officially approved by the State Council to start researching and developing legal digital currency by the end of 2017. By 2024, the pilot range of digital RMB has expanded to 17 provinces and 26 cities. Based on this, digital RMB cross-border payment as a new development direction can effectively utilize the cooperation between countries to obtain the recognition of national central banks of various countries for the application of digital RMB cross-border payment,

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thereby further promoting the process of RMB internationalization.

2.A literature review on digital RMB

2.1A review of research on digital RMB

Sirui Lei (2023)[1] starts from the understanding of the conceptual connotation of digital RMB and analyzes its features from the legal, technical, application, and product levels. Enda Xie (2023)[2] systematically sorts out the development history of digital RMB and uses the SWOT method to analyze its advantages and disadvantages in the domestic and foreign markets, as well as the opportunities and challenges it faces. Based on the existing research results, Xie gives relevant development strategies.

2.2A literature review on digital RMB cross-border payment

In response to the issue of digital RMB cross-border payment, Jianping Ji (2023)[3] conducted a thorough analysis of the application of digital RMB cross-border payment, examined the development foundation and the problems faced in its development, and elaborated its short-term, medium-term, and long-term development models. Lu Song (2023) [4]believes that utilizing digital RMB for cross-border payment not only expands its application but also effectively solves certain problems in traditional cross-border payment, thereby driving the further improvement of the cross-border payment system. Benxiang Yuan (2023)[5] analyzed the current situation of cross-border payment settlement in China and found that the current settlement efficiency is low and the cost is high. Using digital RMB can remedy these defects, greatly improve China's cross-border payment settlement efficiency, and also break the monopoly of foreign countries on the international payment and settlement system ensuring China's financial security. Based on this, the author discussed many issues from the perspectives of technological innovation, standardization of payment information, payment and settlement system with global digital currency, and exploration of cooperation modes of digital RMB cross-border payment and settlement.

2.3A literature review on the impact of digital RMB cross-border payments on RMB internationalization

Combining the actual conditions of China, Xinyu Zhao (2023)[6] studies the relationship between digital RMB and strategies of RMB internationalization, analyzes its development process and ultimate effect, and then explores its role in RMB internationalization strategy. Huihui Liu (2023) [7]starts from the current development of RMB internationalization and explores the new progress and new problems it brings to the development of RMB internationalization, proposing that a digital currency based on blockchain can explore a new path for RMB internationalization, which has great significance in enriching the cross-border transaction environment of RMB, weakening the inertia of the US dollar, and safeguarding national economic security. Jing Yan (2023)[8] starts from the development status of digital RMB and analyzes its advantages in internationalization, and finally discusses how to use

digital RMB to support the process of RMB internationalization and analyzes the existing problems.

Through a review and analysis of the existing literature on the application situation of digital RMB, the progress of digital RMB cross-border payment, and its impact on RMB internationalization, it is found that there has been some progress in research on the cross-border payment of digital RMB. However, there are still some issues that need further research, such as the differences in relevant regulations between China and other countries under the digital RMB system, the limitations of existing cross-border payment systems, etc. Therefore, this paper starts from the perspective of digital RMB cross-border payment and explores its impact on RMB internationalization.

3.The concept of digital RMB and current situation of cross-border payment

3.1The concept of digital RMB

Digital RMB is different from Alipay's third-party digital currency denominated in RMB, nor is it the central bank's electronic payment. It is managed and used by the central bank, with national credit backing. Digital RMB has the following four characteristics: it is issued by the central bank, a type of legal digital currency; it uses centralized management and dual-layer operation; it will coexist with physical RMB and remain a payment voucher based on cash; it is a retail central bank digital currency, with its main function being to meet the domestic retail payment needs.

According to data released by the People's Bank of China, the cumulative transaction amount of digital RMB reached 700 billion yuan by the end of June 2024. It has continued to explore applications in wholesale and retail, catering and tourism, education and healthcare, and has developed a number of replicable and scalable solutions covering both online and offline scenarios. This has significant implications for boosting resident consumption, promoting green transformation, and optimizing the business environment.

3.2The current situation of digital RMB cross-border payment

In 2020, the Bank of China launched its first cross-border digital RMB pilot program in Hong Kong, which is now basically covering individuals and companies in Hong Kong. Individual customers in Hong Kong can use digital RMB both within the territory and the mainland, while merchants in Hong Kong can also use digital RMB. Companies in Hong Kong and the mainland can also use digital RMB for cross-border transactions. In February 2021, the Innovation Hub of the Bank for International Settlements (Hong Kong), the Bank of Thailand (the central bank of Thailand), the Central Bank of the United Arab Emirates, the Digital Currency Research Institute of the People's Bank of China, and the Hong Kong Monetary Authority jointly launched the Multi-Central Bank Digital Currency Bridge Project to explore the application of central bank digital currency in cross-border payments. The development of digital RMB represents a new opportunity for the cross-border payment system in China, and its timely development and launch will greatly enhance the international status of the RMB. At

the same time, if digital RMB can be implemented as soon as possible, its technology and operational logic will be easier to be accepted by other countries, thereby obtaining a leading advantage.

4.Analysis of Opportunities and Challenges for Digital RMB Cross-border Payments in the Process of RMB Internationalization

4.1 Opportunities for Digital RMB Cross-border Payments

4.1.1The RMB internationalization has accelerated

The process of RMB internationalization has been steadily advancing and deepening, from initial discussions to the promotion of pilot programs, to the expansion and in-depth development of full-scale implementation. RMB internationalization has achieved significant achievements. In 2015, RMB was approved as a basket currency of IMF Special Drawing Rights, which became a key milestone in the process of RMB internationalization and gradually increased its share in international trade and investment. Due to the growing concern among world leaders that the US dollar may become the dominant currency in the world, many countries are actively seeking diversified exchange rate policies, and an increasing number of enterprises and countries hope to rely less on the US dollar to enhance their economic resilience. By the end of 2023, over 75 central banks in more than 75 countries and regions had included RMB in their foreign exchange reserves, and the People's Bank of China had approved 27 overseas RMB settlement institutions, covering 25 countries and regions. The establishment and operation of the RMB cross-border payment system has greatly improved the efficiency of RMB use internationally, laying a solid foundation for the promotion of digital RMB cross-border payments.

4.1.2 The acceptance of the RMB in countries along the Belt and Road Routes has increased

With the deepening implementation of the Belt and Road Initiative, China's outward foreign direct investment relies on overseas infrastructure construction, commodity imports and exports, etc., which has improved the acceptance of the RMB by overseas investors. These have created favorable market conditions for China to issue digital RMB overseas. On the one hand, China has a fairly complete industrial chain and a rich product market, which can better serve the trade needs of countries along the Belt and Road routes. Legal digital currency provides more convenient, secure and efficient payment means. On the other hand, for countries and regions along the Belt and Road routes where financial infrastructure is not fully developed, by establishing intelligent digital RMB transaction systems, it can effectively solve the problem of contracts not being fulfilled in time, ensuring the stability of trade and promoting economic and trade cooperation between China and relevant countries.

4.1.3The cross-border payment system for the RMB is constantly improving

The People's Bank of China launched the construction of the Cross-border Interbank Payment System (CIPS) in 2012, going through stages such as demand analysis, software

development, system integration, business testing, and simulated operation before officially going into operation on October 8, 2015. By the end of 2023, there were a total of 1,484 participants, including 139 direct participants and 1,345 indirect participants, with business coverage in 182 countries and regions around the world, and services provided to more than 4,400 corporate banking institutions globally, [9]laying a solid foundation for the RMB internationalization and the future global promotion of digital RMB.

4.2Challenges for Digital RMB Cross-Border Payments

4.2.1The lack of a global regulatory framework

The central bank uses digital RMB for cross-border payments, as it has digital and cross-border characteristics, its regulatory difficulty is far higher than that of traditional currencies. The current financial regulatory system has not taken into account the flow of sovereign digital currencies around the world, therefore, it is necessary to establish a global financial regulatory system, which puts forward higher requirements on transparency, interoperability, inclusiveness and adaptability of the existing financial system. With the launch of "digital RMB", China has more international right of speech in the global currency and financial system, but also brings new challenges. Traditional strong currencies will become a barrier to RMB internationalization.

4.2.2 Poor quality of existing financial institutions

Currently, even within the framework of the Belt and Road Initiative, Chinese commercial banks' operations still have a significant gap compared to those of developed countries such as the US and Europe. In the application of digital RMB, domestic financial institutions are facing a transformation issue, which involves all aspects of the circulation of digital RMB, including its issuance, transmission, and redemption. The payment and settlement system also needs to consider the efficiency and stability of multiple parallel transactions, as well as the tracking and monitoring of the cross-border flow of digital RMB by the regulatory system. Therefore, Chinese financial institutions still need to further improve themselves in order to better promote digital RMB.

4.2.3 The cross-border payment infrastructure is not perfect

Currently, the cross-border settlement of the RMB in China is mainly achieved through the RMB cross-border payment system. When using this system conducting cross-border transactions, a domestic commercial bank's RMB account must be used. However, as the demand for RMB cross-border payments has increased, the drawbacks of the CIPS have become increasingly apparent, including high transaction costs and low efficiency. Additionally, due to its short operating cycle, it cannot achieve cross-time zone settlement, and it is not interconnected with domestic foreign exchange payment system and securities settlement systems, severely restricting the efficiency of digital RMB cross-border circulation. At the same time, the current cross-border payment of digital RMB in China still relies on the CIPS, and the defects of the cross-border payment system also limit the promotion of digital RMB.

5. Suggestions

5.1Build a sound financial system

Building a financial system that conforms to the legal digital RMB and adapting its operation process to it is the only way forward for the financial industry in the digital economy era. To achieve this goal, reform and innovation are needed in technology, operation, and circulation. During the issuance of digital RMB, it is necessary to clarify and standardize technical specifications to lay a solid foundation for building the infrastructure of digital finance. At the same time, we can also use digital RMB in the financial field to reduce the intermediate links in financial transactions and leverage the monitorability of digital RMB to better prevent and resolve financial risks and enhance the stability of the financial system. Currently, although the pilot project of digital RMB is being carried out steadily, this does not mean that the process of RMB internationalization will unfold as digital currencies are used and popularized. Therefore, strengthening the construction of a more robust financial system will help RMB to have a more comprehensive role definition and promote the healthy development of RMB internationalization.

5.2 Improve the regulatory framework for financial institutions in China

Currently, there are still many uncertainties in the issuance and promotion of digital RMB, and the difficulties of standardizing it and the related regulatory system also need further improvement, which undoubtedly puts higher demands on the regulatory authorities. Financial institutions, as the key link in realizing the cross-border payment of digital RMB, should dig out and expand more diverse and comprehensive wealth management, bill and credit products based on the characteristics of digital RMB, fully expanding the development opportunities brought by digital RMB and improving them comprehensively. Based on this, more scenarios and more stylish financial products can be designed. This also provides the legal basis and institutional guarantee for the development of various links in the issuance, circulation and other aspects of digital RMB, so that it can respond to new economic situations and ensure a smooth promotion process, promoting RMB internationalization.

5.3Improve the cross-border payment system for digital RMB

In the process of the continuous promotion of RMB internationalization, on the one hand, the RMB internationalization and the cross-border circulation of digital RMB have common basic conditions, goals, and development directions. The cross-border circulation of digital RMB is carried out under the premise of RMB internationalization, and is oriented towards the internationalization of RMB. On the other hand, we need optimize the cross-border payment system for RMB (CIPS) and guide domestic and overseas individuals and enterprises to use digital RMB for payment and settlement within this system. At the same time, we can prioritize using digital RMB for payment and settlement when conducting trade with countries along the Belt and Road routes, thereby promoting the widespread use of RMB globally and promoting its widespread recognition globally.

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RESEARCH ON THE EFFICIENCY AND POTENTIAL OF CHINA'S AGRICULTURAL EXPORTS TO RCEP COUNTRIES——BASED ON STOCHASTIC FRONTIER GRAVITY MODEL

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Abstract: Based on panel data of China's agricultural exports to RCEP member countries from 2006 to2022, this paper constructs a time-varying stochastic frontier gravity model to empirically study the factors affecting the export efficiency of China's agricultural products. The results show that there are significant differences in the trade efficiency of China's agricultural exports to RCEP countries, and the trade potential of different countries is also different; The bilateral population, the economic size of RCEP member countries, the common language, the air cargo volume of the importing country, the degree of government integrity, financial freedom, and whether to join the WTO all have a significant promoting effects on China's agricultural exports; The geographical distance between two sides and the monetary freedom of the importing country will have a negative impact.

Key words : RCEP; agricultural trade; stochastic frontier gravity model; trade potential

1.Introduction

The world today is undergoing major changes unprecedented in a century. The international environment has become increasingly complex with obviously increased instability and uncertainty. The global economy is in the doldrums, and the agricultural trade is also facing severe challenges, with its scale and growth slowing down. Under the background of intensifying international trade disputes, regional economic cooperation has become an important trend in the development of international trade. The Regional Comprehensive Economic Partnership (RCEP) represents a significant breakthrough achieved by China in the realm of regional economic collaboration and constitutes a pivotal landmark within the contemporary

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landscape of international trade. The RCEP represents the world's largest free trade bloc that brings together 10 ASEAN countries as well as China, Japan, South Korea, Australia, and New Zealand. And it entered into force on January 1, 2022. Trade in agricultural products plays an important role in economic and trade cooperation between China and RCEP member countries. The RCEP agreement has promoted the growth of trade in agricultural products by optimizing trade structure and reducing trade costs. According to statistics, in 2022, China's agricultural exports to RCEP member states reached 41.542 billion US dollars, accounting for 42.3% of the total agricultural exports in the same period. Due to the different resources and comparative advantages of China and RCEP member countries, its agricultural trade has vast cooperation potential. Therefore, the study of the factors affecting the efficiency and potential of agricultural trade between China and RCEP member countries is of great practical significance for adjusting the export structure of agricultural products and delivering the mutual benefit and win-win results to bilateral agricultural trade.

2.Literature Review

2.1. Research related to domestic and foreign trade of agricultural products

Scholars' research on agricultural trade mainly focuses on three aspects: trade characteristics, trade efficiency and trade potential. Regarding trade characteristics, Park Suk-jae et al. (2023)[1]analyzed the competitiveness and complementarity of agricultural trade between Korea and CPTPP countries by means of relevant indexes and discovered that the trade complementarity index between Korea and CPTPP countries was generally high, featuring strong complementarity and vast space for cooperation and development. In addition, some scholars have conducted empirical studies on the efficiency and potential of agricultural trade by using gravity model. Y Choi et al. (2024)[2]employed gravity models to assess the influence of trade policies on bilateral trade between India and the United States as well as the potential effect on global agricultural trade. It was discovered that the abolition of tariffs considerably augmented US exports to India and decreased domestic prices in India. JM Balogh et al. (2019)[3]examined the influence of geographical closeness, cultural resemblance, and free trade agreements on bilateral agricultural trade, as well as intra-industry trade among EU member states and trading partners. It was found that EU countries export a greater quantity of agricultural products to the common market. By comparing Ghana's bilateral exports with its per capita domestic wages, Man u(2020)[4]contended that Ghana possesses immense trade potential in agricultural products.

2.2. Research on China's Agricultural Trade with RCEP Countries

Since the RCEP agreement was put forward, scholars have carried out extensive studies on RCEP and its agricultural trade with China. Among them, the research on agricultural trade between China and RCEP member states mainly centers on the current situation, trade efficiency and potential of agricultural trade. The primary aspect lies in the research regarding the current status of agricultural trade. Qian Jingfei et al. (2022)[5]conducted an analysis of the current status of agricultural trade

between China and other RCEP members and believed that the implementation of the RCEP agreement would contribute to ensuring the effective supply of bulk agricultural products for China at lower prices and fulfilling the upgrading demands of domestic residents' food consumption. Tan Yanwen et al. (2024)[6]thought that the implementation of CAFTA had a significant impact on the agricultural products trade between China and ASEAN. The growth of agricultural products trade between China and ASEAN mainly comes from the trade creation effect rather than trade diversion effect.

The second aspect pertains to the investigation into the efficiency, potential, and influencing factors of agricultural trade. Shi Chao and Hu Lequ (2022)[7]analyzed the agricultural trade efficiency between China and RCEP countries within the context of rural revitalization, and maintained that China's higher agricultural trade competitiveness significantly promoted the export trade efficiency, while the enhanced agricultural trade competitiveness of other countries within the RCEP framework would exert a positive influence on improving the import trade efficiency. Zhao Liang (2023)[8]discovered the population size and per capita GDP of the importing country have a significant positive impact on the export of animal products, food and beverage and tobacco products. Distance has a significant positive impact on animal products, food and beverage and tobacco products. Whether to sign bilateral FTA has a positive effect on the export of plant products, food and beverage and tobacco products, but has a negative effect on the export of animal and vegetable fats. Xiao Yuting et al. (2023)[9]discovered that the export potential of Xinjiang agricultural products and RCEP member countries was generally manifested as potential development, with greater potential release space. Li Ming et al. (2021)[10]contended that the trade efficiency among different countries varies significantly, and the volume of air cargo, the number of Internet users, the degree of trade liberalization and the extent of government participation of the importing country all exert varying degrees of influence on the trade efficiency of agricultural exports. Cheng Yunjie and Liu Xian (2022)[11]discovered that there is significant country heterogeneity in the efficiency and potential of China's agricultural imports from RCEP member countries, and that the trade potential and expansion space for China's agricultural imports from Australia and New Zealand are considerable.

In summary, there are scarce studies on the trade efficiency and potential of agricultural products between China and RCEP member countries from the perspective of diverse market segments. Since the trade environment and potential of different market segments in RCEP countries are varying, the analysis of the trade efficiency of various types of agricultural products can clarify the competitive advantages of different countries in distinct markets, thereby optimizing resource allocation. The paper selected the export data of agricultural products from China to 13 RCEP member countries spanning from 2006 to 2022 to analyze the relevant factors influencing the efficiency and potential of agricultural trade (because of the small export volume of Brunei and the absence of data, no research was conducted), with the aim of optimizing the structure of China's agricultural trade and promoting the development of agricultural trade in the direction of high quality and high added

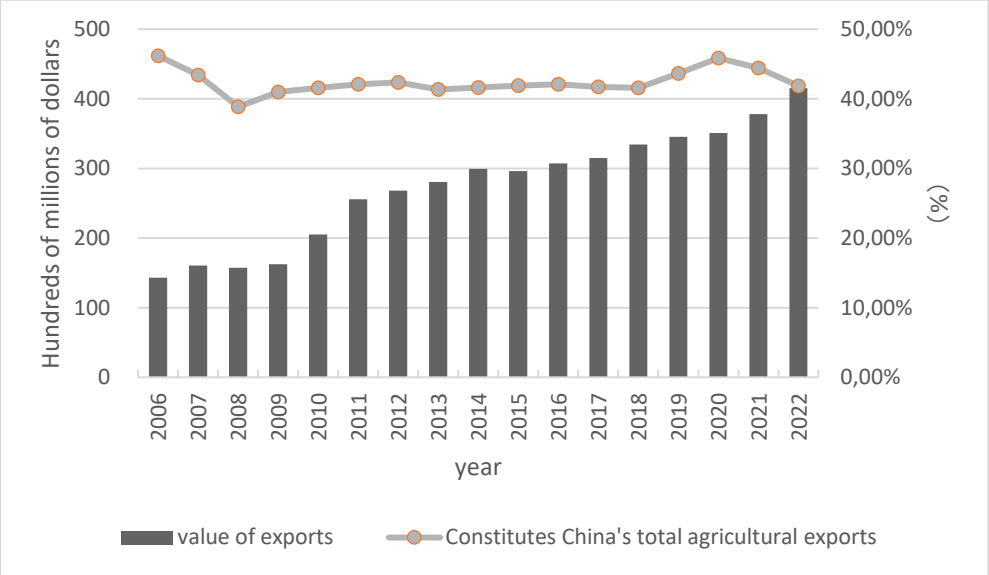
value.

3.Research on the current situation of China's agricultural exports to RCEP member countries

3.1. Agricultural export scale

As shown in Figure 1, the overall trade volume of China's agricultural products exports to RCEP countries from 2006 to 2022 showed a fluctuating upward trend. It increased from 14.329 billion US dollars in 2006 to 41.542 billion US dollars in 2022, with an average annual growth rate of 7.15%. Concerning the export ratio, the influence of the financial crisis led to a reduction in the proportion of China's agricultural exports to RCEP member countries within the aggregate of China's total agricultural exports in 2008, which accounted for 38.85%. In other years, China's agricultural exports to RCEP member states had a small change in the proportion of China's total agricultural exports, which remained above 40%. It indicates that the member states of the RCEP are significant markets for China's agricultural exports and play an important role in China's agricultural export trade. The development of agricultural export trade between China and RCEP member countries is conducive to promoting regional trade cooperation, expanding economic ties, and enhancing exchanges and cooperation between regions on agricultural products.

Fig.1 China's agricultural exports to RCEP member countries from 2006 to 2022



Source: Compiled in accordance with the United Nations Commodity Trade Statistics Database and the Ministry of Agriculture and Rural Affairs of China.

3.2. Agricultural export structure

According to HS2002 classification standard, agricultural products listed in the UN Comtrade database are categorized into three main groups: animal-derived products, fruit and vegetable products and food processing products[2]. According to

2 HS01 ~ HS05 are animal products, HS06 ~ HS15 are fruit and vegetable products, and HS16 ~ HS24 are

the analysis, significant variances are observed in the export structure of China's agricultural trade to RCEP member countries. China mainly exported fruit and vegetable products and food processing products, which together accounted for about 80% of the total trade in agricultural products. The export of animal products was the smallest, accounting for only about 20% of the total export of agricultural products. It showed the imbalance of agricultural export structure. In 2020, due to the shock of the COVID-19 pandemic, some countries announced import restrictions such as quarantine and certification. This change led to a decline in the export of animal and fruit and vegetable products, while the proportion of food processing products gradually increased, becoming the main part of the export structure. Consequently, food processing agricultural products are the comparative advantage of China's exports to RCEP member countries.

4.Model Construction and Data Sources

4.1. Model Setting and Variable Selection

4.1.1. Setting of Stochastic Frontier Gravity Model

In the present study, we use Armstrong's approach and delineate the stochastic frontier gravity model as follows:

$$\ln Y_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln POP_{it} + \beta_4 \ln POP_{jt} + \beta_5 \ln DIS_{ij} + \beta_6 B_{ij} + \beta_7 L_{ij} + \nu_{ijt} - \mu_{ijt} \quad (8)$$

Y_{ijt} denotes China's actual agricultural exports to other RCEP member countries during the t period. GDP_{it} denotes the GDP of China during the t period. GDP_{jt} denotes The GDP of RCEP member countries during the t period. POP_{it} denotes the population of China during the t period. POP_{jt} denotes the population of RCEP member countries during the t period. DIS_{ij} denotes the geographical distance between China and RCEP member countries. i represents China, while j denotes the member countries of RCEP. The dummy variables B_{ij} and L_{ij} are indicative of a binary condition. When country i shares a border and a common language with country j, the value is 1, otherwise it is 0.

4.1.2. Setting of Trade Inefficiency Model

processed food products.

Taking into account the multitude of influencing factors for non-efficiency items, the construction of the trade non-efficiency model outlined in this paper is as follows:

$$\mu_{ijt} = \alpha_0 + \alpha_1 \ln AIR_{jt} + \alpha_2 GI_{jt} + \alpha_3 GS_{jt} + \alpha_4 Bf_{jt} + \alpha_5 Mf_{jt} + \alpha_6 Tf_{jt} + \alpha_7 Ff_{jt} + \alpha_8 FTA_{ijt} + \alpha_9 WTO_{jt} + \varepsilon_{ijt} \quad (9)$$

AIR_{jt} denotes the volume of air cargo among RCEP member countries during the t period. GI_{jt} denotes the level of government integrity among RCEP member countries during the t period. GS_{jt} denotes the levels of government spending of RCEP member countries during the t period. Bf_{jt} denotes the commercial freedom of RCEP member countries during the t period. Mf_{jt} denotes the monetary freedom of RCEP member countries during the t period. Tf_{jt} denotes the trade freedom of RCEP member countries during the t period. Ff_{jt} denotes the financial freedom of RCEP member countries during the t period. μ_{ijt} denotes trade inefficiency, α_i stands for the parameters to be estimated. FTA_{jt} and WTO_{jt} are binary indicators, If the importing nation enters into a free trade agreement with China or joins the World Trade Organization, the value is 1, otherwise it is 0.

5.Empirical Result and Analysis

5.1. Model Suitability Test

To guarantee the suitability and veracity of the model, it is imperative to conduct Likelihood Ratio (LR) tests to evaluate the model's configuration prior to the analysis of outcomes. Table 1 illustrates that four experiments were conducted within this study to evaluate the suitability and temporal variability of the non-efficiency factors within the model, and to ascertain the ultimate variables chosen for the model's specification. The empirical results indicates that at a significance level of 1%, the LR statistic stands at 209.4, leading to the rejection of the null hypothesis suggesting the absence of trade inefficiency. Consequently, the stochastic frontier gravity model is deemed suitable for estimating trade inefficiency. Moreover, at the same significance level, the LR statistic is 26.74, resulting in the rejection of the null hypothesis positing no temporal variation in trade non-efficiency. Hence, it is more appropriate to employ a time-variant stochastic frontier gravity model for the estimation of trade efficiency of China's agricultural exports to RCEP member states from 2006 to 2022. Given that the language variable successfully clears the test while the boundary variable does not, it is pertinent to eliminate the latter. Consequently, following the aforementioned analysis, the definitive structure of the stochastic frontier gravity model is established

as follows:

$$\ln Y_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln POP_{it} + \beta_4 \ln POP_{jt} + \beta_5 \ln DIS_{ij} + \beta_6 L_{ij} + v_{ijt} - \mu_{ijt} \quad (10)$$

Table 1 Test results of the stochastic frontier gravity model

Null Hypothesis	Constraint Model	Unconstrained Model	LR Statistics	1% Critical Value	Test Conclusion
Trade inefficiencies are nonexistent	-155.44	-50.28	210.32	14.325	Reject
Trade inefficiencies remain unchanged over time	-50.28	-36.79	26.98	12.483	Reject
No common borders are presented	-36.82	-36.79	0.06	10.501	Accept
No common language is presented	-45.28	-36.79	16.98	10.501	Reject

5.2. The Estimated Results of Stochastic Frontier Gravity Model

Table 2 illustrates the outcomes of regression analyses implemented on the ordinary least squares (OLS) model, the time-invariant model, and the time-variant model within the scope of this study. The regression analysis reveals that the parameter γ yields a value of 0.83 in the time-invariant model and 0.97 in the time-variant model, respectively, successfully passing the 1% significance level test. This suggests that the disparity between China's agricultural trade development level and its trade potential among RCEP member countries is primarily attributed to inefficiencies in trade.

Table 2 Estimation results of the stochastic frontier gravity model

Estimation approach	OLS model		Time-invariant model		Time-varying model	
Variable	coefficient	t value	coefficient	t value	coefficient	t value
β_0	-244.94***	-6.94	-225.97***	-24.73	-284.53***	-7.85
$\ln GDP_{it}$	0.01	0.12	-0.02	-0.67	0.01	0.56
$\ln GDP_{jt}$	0.74***	30.43	0.99***	13.37	1.06***	18.54
$\ln POP_{it}$	11.43***	6.64	10.51***	21.06	12.94***	7.30
$\ln POP_{jt}$	0.5***	13.25	0.22	1.08	0.51***	4.32
$\ln DIS_{ij}$	-0.46***	-7.39	-0.38	-1.12	-0.47**	-2.15
L_{ij}	1.27***	12.28	0.98*	1.66	1.66***	4.67
σ^2	0.25	-	0.45***	3.07	1.85	0.90
γ	-	-	0.83***	18.59	0.97***	26.04
μ	-	-	1.22***	3.65	0.39	0.22
η	-	-	-	-	-0.03***	-5.19
Log likelihood	-157.94		-57.15		-36.82	
The value	-	-	201.57		242.24	

Note: *, ** and *** respectively indicate that the coefficients pass the significance test at the levels of 10%, 5% and 1%.

The coefficient of GDP_{jt} has exceeded the 1% significance level, registering a positive value, suggesting a significant and positive correlation between the aggregate GDP of the RCEP member nations and their imports of Chinese agricultural commodities. As the economic development level of these member countries progresses, the demand and purchasing power for agricultural products are likely to escalate, thereby fostering an increase in the imports of Chinese agricultural products.

The coefficient of GDP_{it} is positive but not significant, suggesting that the level of China's economic development has a negligible promotional effect on the export of agricultural products. This is due to the fact that the export of agricultural products is influenced by a multitude of complex factors, and it is possible that other variables may exert a more substantial impact.

Both POP_{it} and POP_{jt} pass the significance level test of 1% and the coefficient is positive, indicating that the increase of population in the two countries has significantly promoted the export of China's agricultural products. The expansion of China's population facilitates the provision of an enhanced labor pool, which in turn augments the quality and standards of agricultural production within the nation. Consequently, this development bolsters the competitiveness and allure of Chinese agricultural commodities within the RCEP market, potentially leading to an escalation in export volumes. Concurrently, the rise in the population of RCEP member states augments the market magnitude, thereby amplifying the demand for agricultural produce.

The DIS_{ij} coefficient is negative and passes the significant test of 5%, indicating that geographical distance is an important factor hindering the export trade of agricultural products. The increased geographical distance between China and the member states of the RCEP is directly proportional to the elevated transportation costs, which in turn pose a more adverse impact on China's agricultural exports. Nevertheless, the coefficient is comparatively modest, suggesting that as maritime infrastructure across countries continues to enhance, the mitigating impact of geographical distance on trade will progressively diminish.

The L_{ij} coefficient is positive and passes a significant test of 1%, indicating that a common language plays an important role in agricultural trade between China and RCEP member countries, effectively promoting agricultural exports between China and RCEP countries by improving communication efficiency, reducing cultural barriers, and promoting understanding and trust.

5.3. The Estimated Results of Trade Inefficiency Model

Table 3 displays the calculated outcomes of the trade inefficiency model. Detailed analysis is as follows:

The AIR_{jt} coefficient is negative and passes the significance level test of 5%, indicating that the improvement of transportation capacity can effectively promote trade efficiency. The increase in air cargo volume among RCEP member countries not only improves the logistics efficiency of agricultural products between China and these countries, but also enhances the efficiency of the entire trade process, thus promoting China's agricultural exports to RCEP countries.

The GI_{jt} coefficient is negative and passes the significance level test of 5%, suggesting that the pristine political climate of the RCEP member states contribute to the enhancement of administrative efficacy and transparency, the curtailment of bureaucratic red tape and corruption, and the establishment of a more equitable, transparent, and predictable business milieu for both domestic and international enterprises, thereby bolstering trade efficiency. The GS_{jt} coefficient is positive and passes the 1% significance level test, suggesting that an increase in government expenditure in the importing nation could prioritize investment within its domestic agricultural sector, potentially resulting in a reduction of demand for imported agricultural products.

The coefficients of Bf_{jt}, Tf_{jt} and Ff_{jt} are negative and all pass the significance level test, suggesting that a congenial business climate, openness to free trade, and a robust financial framework in importing nations contribute to the enhancement of China's agricultural export efficiency to those destinations. Mf_{jt} passes the significance test, but the coefficient is opposite to the expected sign. This may due to the fact that increased monetary freedom may lead to sharp fluctuations in exchange rates, which in turn affect the prices of agricultural exports, and thus adversely affect China's agricultural exports.

FTA_{ijt} exhibits a positive correlation with trade inefficiency, contrary to the anticipated sign. This could be attributed to the fact that China maintains a trade deficit in agricultural products with certain RCEP member countries. Consequently, Chinese agricultural products are placed at a competitive disadvantage relative to those of other nations, thereby impacting overall trade efficiency. WTO_{jt} is negatively correlated with trade inefficiency but not significantly. This may be attributed to the inherent lag in the effective duration of cooperative initiatives, which dampens the immediate impact of this factor on enhancing China's agricultural trade efficiency. It is our contention that with the elapse of time and the deepening of market integration, its potential impact will gradually emerge.

Table 3 The estimated results of trade inefficiency model

stochastic frontier gravity model			Trade Inefficiency Model		
Variable	coefficient	t value	coefficient	t value	coefficient
β_0	-244.32***	-178.29	α_0	-0.23	-0.21
$\ln GDP_{it}$	-0.05**	-2.57	$\ln AIR_{jt}$	-0.04**	-2.03
$\ln GDP_{jt}$	0.26***	10.40	GI_{jt}	-0.02**	-2.07
$\ln POP_{it}$	11.91***	164.22	GS_{jt}	0.06***	5.96
$\ln POP_{jt}$	0.79***	25.51	Bf_{jt}	-0.02**	-2.34
$\ln DIS_{ij}$	-0.48***	-11.76	Mf_{jt}	0.04***	3.54
L_{ij}	0.99***	16.82	Tf_{jt}	-0.05***	-5.01
σ^2	0.32***	9.56	Ff_{jt}	-0.01**	-2.05
γ	0.96***	58.07	FTA_{ijt}	0.08	0.38
			WTO_{jt}	-0.13	-0.48
Log			-62.14		
The value of the LR test			191.60		

5.4. Analysis of Trade Efficiency and Trade Potential

5.4.1. Analysis of Total Agricultural Products

Table 4 The trade potential and expansion space of China's agricultural exports to RCEP member countries in 2022

National	Trade efficiency	Actual exports (USD 100 million)	Trade potential (USD 100 million)	Expansion space (%)
Japan	0.78	104.53	133.51	27.72
South Korea	0.74	61.17	82.41	34.72
Australia	0.91	14.25	15.61	9.54
New Zealand	0.97	3.28	3.37	2.74
Indonesia	0.21	26.85	125.59	367.75
Malaysia	0.91	53.52	58.62	9.53
Philippines	0.43	27.13	63.35	133.51
Thailand	0.94	48.21	51.33	6.47
Singapore	0.94	14.24	15.07	5.83
Cambodia	0.31	2.10	6.76	221.9
Laos	0.17	0.56	3.31	491.07
Myanmar	0.23	4.75	21.09	344
Vietnam	0.86	54.82	64.07	16.87

Table 4 illustrates that in the estimation of trade potential for China's agricultural exports to the RCEP member states in 2022. Japan, Vietnam, South Korea, and Indonesia emerged as the leading nations. In light of their considerable trade potential,

it is imperative for China to prioritize the exportation of agricultural products, enhance negotiations and collaborative efforts, and endeavor to augment policy patronage and facilitate trade. Such measures are conducive to a further amplification of agricultural exports to these nations. Upon analyzing the expansion potential of China's agricultural exports to the RCEP member nations, Cambodia, Laos, Myanmar, and Indonesia emerged as the top four performers. This suggests a pivotal role for these countries in the agricultural trade's future trajectory. To capitalize on this, it is imperative for China to enhance its dialogue and collaborative efforts with these nations. By executing targeted strategies—such as refining trade policies, bolstering product competitiveness, and improving market access—China can incrementally augment its agricultural export market share within these countries, thereby fostering mutually beneficial trade alliances.

5.4.2. Analysis of Subdivided Agricultural Products

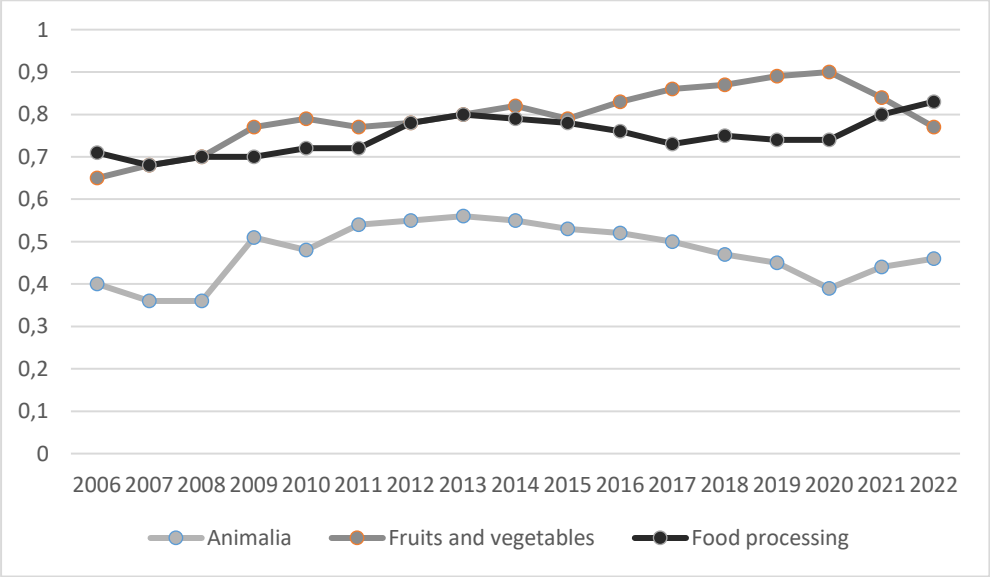


Fig.3 Trade efficiency of segment product markets among RCEP member countries from 2006 to 2022

Source: Compiled based on the regression results of Frontier4.1

As depicted in Figure 3, the trade efficiency within the product market segments of the RCEP member nations had exhibited variability over recent years. Particularly, the agricultural exports from both China and the other RCEP member countries predominantly consist of fruits and vegetables, which displayed a notable export efficiency. This can be attributed primarily to the diverse array and superior quality of Chinese fruit and vegetable exports, in addition to the facilitating effects of tariff reduction and market access liberalization initiatives fostered within the RCEP framework. With the persistent advancement of food processing technologies and the consistent enhancement of product quality, the export efficiency within this market segment is gradually increasing. The export efficiency of animal products might be constrained by a multitude of factors including animal disease prevention and control, standards for quality and safety, market demand and the trade efficiency thereof necessitates enhancement. As depicted Table 5, marked disparities exist among the

member nations of the RCEP agreement with respect to trade efficiency, trade potential, and the expansion capacity of various product categories. In 2022, the trade efficiency of food processing products within the Indonesian market demonstrated a noticeably lower performance, indicating a substantial potential for growth and development. This region stands as a pivotal point for future increases in trade profitability. Conversely, although other countries display higher trade efficiency, they also harbor opportunities for further expansion. In the animal products market, nations such as Laos, Myanmar, Singapore, Indonesia, Malaysia, and South Korea present substantial opportunities for growth, indicating favorable prospects for future export trade. In the domain of fruit and vegetable products, the trade efficiency of Australia, Singapore, Vietnam, and New Zealand has all surpassed the threshold of 0.9, suggesting that China's agricultural products exhibit robust competitiveness within this sector. Conversely, Thailand, Laos, and Myanmar present greater potential for growth and development. In the anticipation of future prospects, China is poised to capitalize on its inherent resource superiority, adeptly realigning its export strategies across nations characterized by varying trade efficiency and growth potential, thereby intensifying trade collaborations and catalyzing the continued advancement of export-oriented trade.

Table 5 Trade potential and expansion space of three types of agricultural products in 2022

(unit: USD 100 million, %)

National	Animal products		Fruit and vegetable products		Food processing products	
	Trade potential	Expand space	Trade potential	Expand space	Trade potential	Expand space
Japan	38.29	78.57	35.29	33.33	62.9	11.11
South Korea	30.55	112.77	28.42	61.29	34.34	17.65
Australia	2.42	85.19	3.53	1.01	10.62	12.36
New Zealand	0.39	33.33	0.73	2.04	2.39	5.26
Indonesia	17.53	566.67	16.06	28.21	29.24	150
Malaysia	8.32	132.56	20.67	11.11	32.99	5.26
Philippines	11.25	44.93	8.54	38.89	15.03	13.64
Thailand	8.73	35.14	26.59	58.73	26.32	5.26
Singapore	2.47	185.71	10.22	36.99	7.31	23.46
Cambodia	1.01	69.49	0.48	36.99	1.31	13.64
Laos	0.61	4900	0.31	12.36	0.48	75.44
Myanmar	2.82	566.67	4.1	185.71	3.33	14.94
Vietnam	11.39	78.57	34.15	1.01	16.44	12.36

6. Suggestions

Firstly, it is imperative to enhance the synergistic effect between the RCEP and the Belt and Road Initiative (BRI). The BRI serves as a novel platform to facilitate trade in goods, services, investment, technology, and personnel exchange. It is crucial to advance the integration of the RCEP and the BRI in aligning trade regulations and standards, while strengthening the coordination with countries neighboring China, specifically Thailand, Myanmar, Vietnam, Japan, and South Korea within ASEAN. This strategic alignment should focus on augmenting the export of animal and agricultural products, fostering bilateral trade facilitation, dismantling trade barriers, and enhancing overall trade efficiency.

Secondly, in alignment with market demand and consumption habits of the RCEP member countries, it is imperative to adjust and refine the export structure of agricultural products, with a primary focus on cultivating items that possess competitive advantages. Given the market saturation in New Zealand, China must enhance the export composition of its agricultural products while sustaining the current export scale, thereby continuously expanding the market share of Chinese agricultural products within New Zealand. In relation to expanding and nurturing markets, there is a pressing need to bolster political mutual trust and elevate the level of bilateral trade, considering the significant trade potential and extensive scope for growth. Concerning the nascent markets such as Indonesia, Cambodia, Laos, and Myanmar, China should amplify trade interactions with these nations by developing mutual trade policies, dismantling artificial trade barriers, and enhancing the efficiency of agricultural export trade.

Thirdly, it is imperative to bolster the competitive edge of China's domestic agricultural sector. The nation should deepen collaborative efforts and foster exchanges with member states of the RCEP, thereby elevating the level of openness. It is advisable for the government to reinforce the quality control and safety regulation of agricultural produce, enhance the quality and value addition of these products to satisfy the high-quality agricultural goods demands of RCEP member states. Concurrently, there is a need to augment support for agricultural exporting entities to engage in international marketing initiatives, offering pertinent policy incentives and assisting these enterprises in proactively probing the RCEP market.

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RESEARCH ON INTERNATIONALIZATION DOCKING OF CHINA'S DIGITAL TRADE RULES

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ABSTRACT: *This article looks at the digital economy and digital trade. The article then looks at how the global and Chinese digital economies are developing. It also points out that digital trade is helping the global economy to grow. The article then looks at the differences between China's digital trade rules and global standards. The article suggests ways to improve digital trade in China. These include making domestic laws and regulations better, joining international digital trade agreements, building digital trade in the "Belt and Road" initiative, and joining high-standard free trade areas. These recommendations are designed to bring Chinese practices closer to international standards.*

Key Word: *Digital economy, Digital trade rules, Gaps, International docking*

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1. Introduction

The global economy is currently experiencing a period of decelerating growth, accompanied by historically high inflation and an increase in trade protectionism. These problems are having a significant impact on major traditional industries, which are facing challenges and exhibiting signs of weakness. However, with the continuous development of the global economy and technology, especially the development of big data technology, the digital economy has gained widespread attention. In the contemporary era, data has emerged as a novel factor of production, dedicated to propelling the global economy towards a state of enhanced quality. This is achieved through a combination of factors, including the accelerated transformation of factors, the acceleration of foundation reconstruction, the optimisation and upgrading of dynamics, and the integration of improving quality and innovation. Furthermore, digital trade has emerged as a new growth pole and a new driving force for global economic growth and high-quality development.

2. Connotation and relationship between the digital economy and digital trade

The digital economy is a border concept that encompasses a multitude of elements, including but not limited to big data, cloud computing, artificial intelligence, blockchain, and so forth. The original definition of the digital economy was proposed by Don Tapscott in 1996. In his seminal work, he outlined the defining characteristics of this new economic paradigm, which include knowledge-based, digitisation, virtualisation, molecularisation, integration/networking, disintermediation, convergence, innovation, production, consumption, immediacy, globalisation, incoherence and more. The National Bureau of Statistics of China defines the digital economy as a novel economic form that employs data as the primary production factor, digital technology as the principal driving force, and modern information networks as the essential conduit. Through the comprehensive integration of digital technology with the tangible economy, it fosters continuous advancement in the domains of digitisation, networking, and intelligence within the economic society, thereby accelerating the restructuring of economic development and governance models.

The digital economy has led to a broader understanding of digital trade. There is no agreement among the experts on what digital trade is. There are two main views. The WTO says digital

trade is when goods and services are made, sold or delivered online. This view is more comprehensive and reflects how digital technologies affect international trade. The other view is to define digital trade as only digital products and services(Ya, 2024).

The definition shows that digital economy and digital trade are related. The digital economy is the foundation of digital trade. Improvements in cloud storage, computing services, digital service platforms, artificial intelligence, 5G networks and blockchain have made digital trade easier. Digital trade is a key part of the digital economy. The digital economy has seen major changes as a result of digital industrialisation and industrial digitisation. This has had a big impact on the existing industrial structure and promoted the transformation and upgrading of digital trade. The development of digital trade also helps integrate the digital economy and the real economy and speeds up industrial digital transformation.

3. Current status of the development of the digital economy globally and in China

3.1 Current status of global digital economy development

The global digital economy can currently be analysed by specifically dividing it into developed and developing economies. As a whole, the world is currently in a phase of rapid development of the digital economy. And countries are actively integrating themselves into the world's digital economic torrent, continuously launching digital policies and promoting the reshaping of the world's economic structure.

Naturally, the most effective method of gauging the progress of the digital economy is through the analysis of digital trade. Table 1 shows that the ten countries had more digital trade in 2022 than in 2015. Digital trade is becoming more important for the economy. It is a key part of global trade competition. Developed economies lead in digital trade, while developing economies are catching up. Table 1 shows that developed economies, led by the United States, account for most of the global digital trade. They are competitive in digital technology and digital services, and have a strong global influence. China is also expanding its digital trade. China's digital trade has grown significantly, from US$187.608 billion in 2015 to US$373.106 billion in 2022.

Table 1 Size of digital trade in ten countries, 2015-2022 (in billions of US dollars)

Country	2015	2016	2017	2018	2019	2020	2021	2022
China	1876.08	1992.88	2138.37	2634.46	2740.08	2943.41	3613.19	3731.06
France	2562.18	2638.04	2626.64	2923.39	2797.97	2595.41	2921.77	2898.81
Germany	2867.39	3051.42	3311.06	3643.13	3669.56	3658.23	4332.18	4180.19
India	1611.17	1699.49	1824.08	1975.44	2180.84	2278.82	2654.79	3251.98
Ireland	3479.79	4120.50	4483.92	4994.99	6726.79	7131.66	7734.87	7932.93
Japan	1915.13	2114.17	2207.00	2343.80	2628.53	2670.60	2790.27	2704.76
Netherlands	2986.98	2935.34	3435.38	3997.51	4258.93	3304.14	3549.14	3565.59
Singapore	1722.42	1701.32	1942.65	2212.66	2299.43	2493.50	2894.22	2958.81
UK	3811.41	3787.60	4015.82	4659.74	4591.55	4768.84	5553.59	5463.10
US	6739.11	7134.89	7708.03	7740.35	8181.99	8441.42	9338.41	9910.00

Source: WTO database, United Nations UNCTAD database.

Furthermore, the contemporary state of global digital trade reveals a multi-polar competitive landscape, particularly evident in the formulation of digital trade regulations. The current global digital trade rules are primarily shaped by a select group of developed countries, particularly in the context of the rule system championed and advanced by the United States, the European Union, and Singapore. As follows.

The United States digital trade rules (the American template) are currently the most representative. The United States advocates the unrestricted flow of cross-border data, opposes the imposition of data localisation requirements and emphasises the importance of barrier-free, cross-border international data flows. Furthermore, it advocates for the non-discriminatory treatment of digital products and the provision of support for tariff-free electronic transmission products. Additionally, it seeks to reinforce legislation pertaining to personal information and personal privacy. The present U.S.-Canada-Mexico Agreement

(USMCA), based on the Trans-Pacific Partnership (TPP), represents a further deepening and broadening of established rules and has become the current exemplar of the American template for the highest level of U.S. digital trade rules.

The EU's digital trade rules are well defined. They promote cultural diversity and want to digitise the EU's internal market and make it easier for digital goods and services to move around. The European template also looks at digital taxation. The EU has proposed a digital service tax. This would be a turnover tax on digital services, paid by users. The main rules for the European template are the GDPR, the DSA and the DMA.

The Singapore-Chile-New Zealand Digital Economy Partnership Agreement is the world's first multilateral agreement focused on cooperation in the digital economy. Its main goals are to make it easier to do business online, to make trade paperless, to protect data and ensure security, to recognise digital identities and electronic signatures to make digital transactions safer, and to work together on financial technology and artificial intelligence(Jones et al., 2024).

3.2 Current status of China's digital economy

In the context of intensifying global competition in digital trade and the ongoing evolution of regulatory frameworks, characterised by the emergence of ‘American-style template’ and ‘European-style template', high-level 'new-style template' have emerged. As a major player in digital trade, China has been actively engaged in the modernisation of its domestic regulatory framework through bilateral and multilateral agreements. It active participation in and promotion of the RCEP agreement, and the exploration of a distinctive ‘Chinese-style template’.

The Chinese-style template has the following main features. China is a global leader in e-commerce and cross-border e-commerce. Its policies and regulations are relatively sound. However, it is still developing its approach to cross-border data flows and intellectual property protection. China's data flow is focused on security. The Cybersecurity Law, the Data Security Law, and the Personal Information Protection Law restrict the free flow of data. China also pays more attention to protecting its own security when it comes to international

rules(Wang, 2023). For example, when China joined the RECP, it made sure that everyone knew about the rules on things like sharing information and storing data.

China is strengthening its control over digital trade and joining global rules for digital trade. China has set up a system with four main laws and several other rules. China has also introduced a number of new laws and regulations to strengthen its digital trade market. Internally, China has established a framework that includes the Data Security Law, the Personal Information Protection Law, the Cybersecurity Law, the Measures for Security Assessment of Data Exit, the Measures for Standardising Personal Information, and the Provisions for Promoting and Regulating Cross-Border Flow of Data. Externally, China's digital trade advocacy is largely consistent with WTO rules.

China has included paperless trade in bilateral FTAs and made specific commitments on personal information protection, customs clearance, etc. in multilateral agreements. It has also advocated the adoption of domestic regulatory frameworks only in compliance with United Nations e-commerce law. China has also suggested a temporary tariff exemption for electronic transactions. China also encourages the use of digital signatures and other forms of electronic authentication in bilateral and multilateral agreements. China is also looking at ways to introduce digital massage chair rules. For example, Beijing has a Digital Trade Pilot Zone and a database system pilot zone. Shanghai is creating an international hub port of digital trade.

4. Gaps between China and the world's high-level rules on digital trade rules

China has made progress on digital trade rules, but there are still gaps compared to developed economies like Europe and the United States. This is shown in three ways: rules on how digital products are treated, how data flows and is stored, and rules on protecting rights and interests in the world.

4.1 Non-discriminatory treatment of digital products

Most high-standard digital trade agreements follow the CPTPP framework for non-discriminatory treatment of digital products. The RCEP is not explicit in this regard. The CPTPP and DEPA both guarantee that digital products from each country will be treated

equally. However, they do not apply to intellectual property rights, subsidies, grants, or broadcasting.

The United States has narrowed the scope of the exception in the USMCA to include intellectual property and broadcasting in the non-discriminatory treatment of digital products. The RCEP doesn't make any commitments about digital products. It only says that parties should consider how they treat digital products. China has also censored and controlled culture-related digital products for national security and ideological reasons. It has not committed to the principle of non-discriminatory treatment of digital products, which is different from the CPTPP.

4.2 Cross-border flow of data and localised storage

RCEP, CPTPP and DEPA have similar rules about data flows. Each country must regulate data flows, but the United States makes these rules more binding. It removes the requirement for each country to regulate data flows. CPTPP and DEPA are more strict. They regulate that data can be sent across borders and that any information from each country can be sent. RCEP does not regulate if information sent electronically is personal information(Chen et al., 2022). China may be face the risk of data security issues because the CPTPP and DEPA allow data to flow freely across borders, unlike the RCEP. This could lead to more telecoms fraud, cyber-attacks and other illegal activities.

China's strategy is different. It is based on data sovereignty and security. China still limits cross-border data flows. It regulates that data can only flow freely if it meets certain legal conditions. It is still difficult to meet international trade and economic standards because the data classification and security assessment systems are not yet effective.

The CPTPP and DEPA allow data storage for legitimate public policy objectives, while the RCEP allows it for essential national security interests. The RCEP allows more exceptions for security reasons than the other two. However, high-standard rules such as the CPTPP and DEPA allow for localised data storage in the financial services sector, but prohibit the localisation of computer facilities in financial services. China has not made a commitment to this(Herman & Oliver, 2023).

4.3 Rules for digital rights and interests

RCEP, CPTPP and DEPA all have different approaches to personal information protection. RCEP and CPTPP set out specific requirements, while DEPA sets out principles for a legal framework(BOWN & MAVROIDIS, 2019). China is behind other countries in this area. The United States, Singapore and other countries believe that the CBPR should be used as an international guideline for the protection of personal information. China has not yet reached the CBPR standard.

Secondly, source code is the core of software and is protected by intellectual property rights. Both CPTPP and DEPA prohibit transferring source code, and DEPA's rules are more detailed and easier to adapt. RCEP has not provide source code, but parties may discuss it in e-commerce talks. The CPTPP source code rules protect software products(Wu et al., 2023). When software is sold in another country, the buyer does not have to give the source code. However, this does not apply to software for critical infrastructure. DEPA explains that the source code rule does not apply to 'manufacture, sale, distribution, importation, and use by or for the government of a Contracting Party', and excludes metal tools. China's law does not require companies to share their source code. But foreign companies must work with Chinese companies to protect national security.

All three agreements set out rules to protect consumers. DEPA has the most stringent requirements. CPTPP regulates that countries should protect consumers from fraud and make sure they have good consumer protection laws. The CPTPP also protects consumers from unsolicited commercial emails. DEPA lists the types of misleading or deceptive conduct that consumers can be subjected to(Suh & Roh, 2023). China nearly has no laws protecting online consumers. The right to information and the right to privacy are not well protected. China's digital trade rules are not as high as international standards.

In conclusion, it can be observed that the digital trade regulations in China are not sufficiently compatible, resulting in a high compliance cost. Furthermore, in comparison to the CPTPP and DEPA, China also faces significant challenges in the form of non-uniform digital technology standards, incompatibility of data formats and information barriers between

digital systems.

5. China's implementation measures to dock the international rules on digital trade in major areas

This section will concentrate on the implementation of effective measures to proactively dock China's digital trade regulations with internationally recognised standards. The objective is to narrow the gap and enhance China's status and influence in the global digital trade landscape through a series of concrete and pragmatic initiatives.

5.1 Docking with the high standards of the pilot free trade zone

As the vanguard of China's reform and opening-up, Pilot Free Trade Zones (PFTZs) occupy a pivotal position in aligning with international norms pertaining to digital trade. It is imperative that the advantages of the Pilot Free Trade Zone, namely its status as an early adopter and pilot implementation, be leveraged to their fullest extent. Benchmarking against the world's highest standards, coupled with the implementation of rigorous stress tests and the evolution of digital economy regulations, is a necessity. By exploring the establishment of a 'regulatory sandbox' mechanism and strengthening the coordination and classification of multi-departmental regulation, we can better balance the relationship between data security and flow, and find the best path to expand opening and integrate into high-standard digital trade rules such as DEPA.

Firstly, the data classification and grading system provides an essential foundation for China to reinforce cross-border data flow guidelines and data storage localisation requirements. For this reason, the Pilot Free Trade Zone should be regarded as an experimental zone for system innovation, accelerating the exploration of the in-depth integration of cross-border data flow rules, data storage localisation requirements and China's data classification and grading system. At the same time, China will continue to proactively and gradually construct a data exit assessment mechanism comprising the restricted circulation of high-risk data subject to security assessment and review, and the unrestricted circulation of low-risk data under standard contractual and authentication mechanisms. This will be done in accordance with the Cybersecurity Law, the Measures for Security Assessment of Data Exit, and other pertinent legislation.

Secondly, with regard to the source code provisions for docking high-standard digital trade rules, the Pilot Free Trade Zone in China can draw on the concept of the data classification and grading system to accelerate the establishment of an assessment mechanism to evaluate the expected benefits of the results of the early and pilot implementation. Concurrently, the state should adhere to the tenet of balanced emphasis between economic and security considerations, and initiate the formulation of legislation pertaining to source code protection. This should entail a delineation of the precise scope and exceptions to the mandatory disclosure prohibition of source code. In addition, the construction of a public service platform for copyright export should be actively explored in order to strengthen copyright protection in the field of digital culture.

5.2 Improve domestic digital trade laws and regulations

China has already joined the RCEP. However, compared to the CPTPP、DEPA, the degree of free flow of data、data privacy protection in the RCEP agreement is far less than in the above two agreements. At the same time, in China, the position on the disclosure and transfer of data source code is unclear, and data localisation is required. Therefore, in order to converge with international digital trade rules, China must first address its domestic environment, improve its domestic digital trade laws and regulations, and gradually converge with the world's high-specification and high-standard trade rules. In particular, at present, China's existing digital trade laws mainly include the E-Commerce Law and the Foreign Trade Law of the People's Republic of China, etc. China's digital trade activities are predominantly concentrated in cross-border e-commerce and trade in goods, with relatively limited engagement in digital services and trade related to intellectual property rights. Therefore, the protection of digital intellectual property rights is weaker. It is thus imperative that the Chinese government and relevant legislative bodies provide further elaboration of the laws and regulations pertaining to business practices, logistics services and payment services in the future. With regard to the free flow of data, restrictions should be gradually liberalised, provided that relative security is guaranteed, with a view to gradually realising the de-localisation of data(Zhang & Wang, 2022). At the same time, the market for digital products should be opened up in an orderly manner through the negative list system, while key areas and sensitive technologies should be protected and market access restrictions should be

gradually reduced, on the understanding that this will not violate core national security and public morality.

5.3 Accelerate the process of participating in international agreements on high-standard rules and regulations for digital trade

China should keep pushing to take part in the CPTPP and DEPA because they are important for global security. This is to achieve high-standard digital trade rules on data, data flows and intellectual property rights in the services chapter. At the same time, we should speed up the improvement of existing Regional Trade Agreements (RTAs) to cover more digital trade rules and make it easier for China to take part in the Asia-Pacific digital economy. China has also proposed ways to address the different rules in e-commerce negotiations. This shows China is taking a more active role in setting global digital rules. This paper sets out how China's digital trade is docked with international high-standard rules. It does so by examining three aspects: alignment subject, alignment direction and alignment order.

Firstly, in terms of the alignment subject, China should make full use of the enthusiasm of the central and local governments. As information serves as the foundation for decision-making, it is essential that the central government conducts comprehensive assessments and planning, taking into account all pertinent factors. The local government, for its part, must engage in active cooperation and furnish timely feedback on relevant information. To illustrate, the central government could concentrate on the experimental conditions of the more advanced FTZs (Shanghai Pilot Free Trade Zone, Hainan Pilot Free Trade Zone, Dalian Pilot Free Trade Zone, etc.), in particular, the Hainan Pilot Free Trade Zone, Given the geographical separation of Hainan from the mainland, it could serve as a testing ground for high-standard digital trade rules, capitalising on its inherent geographic advantage and better managing the potential risks of proliferation and spread. Furthermore, the pilot programme is intended to facilitate the alignment process, with the objective of establishing a pilot experience that can then be replicated.

China should move from a passive to an active stance on alignment, forming a Chinese template. This strategy is reflected in digital products, data, data IP rights and rules on using new technologies. China should get a temporary exemption from tariffs on electronic

transmissions and fair treatment of digital products. It should also try to keep some taxes and fees after the border and make policies fairer. China should keep legitimate exceptions for public policy in areas like the free flow of data across borders, the non-compulsory localisation of computing facilities, and the opening up of government data. There should also be a gradual approach to the rules on the non-compulsory localisation of computing facilities for financial services(Suh et al., 2024). China should make rules about data intellectual property rights that fit its situation. These should include source codes, ICT products with encryption, and interactive computer services. The rules should also allow for reasonable exceptions. China should also work with other countries on new technologies like digital identity, financial technology, and artificial intelligence.

Finally, in terms of the alignment order, China should integrate high-standard digital trade rules in a gradual manner, commencing with those that are relatively straightforward and subsequently progressing to those that are more intricate and contentious. It would be prudent to prioritise rule provisions that are more closely docked with existing commitments, and subsequently address those that are more complex and controversial.

5.4 Accelerate the construction of Belt and Road digital trade

In order to deepen two-way investment cooperation with countries along the Belt and Road, China should collaborate with countries along the route to establish economic and trade cooperation zones. This could be the start of a new trade and investment platform for the Belt and Road, with the aim of increasing digital trade. We want top companies and organisations from around the world to take part in this event. We also invite leading scholars and industry leaders to discuss digital trade regulations and market developments. This can be done through events like the China International Digital Economy Expo and the Digital Trade Forum. To build a better "Invest in China" brand, we are making changes to outbound investment, improving investment with other countries, and meeting international economic and trade standards. The Silk Road E-commerce Cooperation Demonstration Zone has been set up to use China's strengths in e-commerce to help countries along the Belt and Road. It also wants to improve communication and dialogue on digital trade rules and speed up the process of aligning international standards, regulations and rules. As we develop the Belt and Road, we want to combine blockchain, big data, the Internet of Things and other new

technologies to create a new business ecosystem based on blockchain and digital trade. This approach will help the countries involved to grow their digital economies much faster.

6. Conclusion

By actively benchmarking international high-standard economic and trade rules, China can assist in resolving the current issues of fragmentation and uncertainty pertaining to digital trade regulations, thereby facilitating the deep integration and synergistic development of the global digital economy. China's vast market size and consumer base will serve as a significant market opportunity for global digital products and services. Concurrently, the rapid advancement and innovation of China's digital technology will offer substantial technical support for global digital trade. This alignment process represents a pivotal step in docking with the global digital economy and enhancing China's digital trade competitiveness. It plays a crucial role in advancing the integration of the global economy and fostering an open, interconnected world economy. Consequently, as China docks its digital trade regulations with international best practices, it must address identified gaps to enhance the regulatory system, stimulate domestic economic and trade growth, and expedite the digitalization process in China's Pilot Free Trade Zone.

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THE BENEFITS OF DIGITAL TRANSFORMATION FOR GOVERNMENTS

Iana Paliova[1]

Abstract

EU Member States prioritize during the 2021-2027 programming period. full digitization of public services by 2030 This goal should be met through European and national funding for the development of artificial intelligence and the creation of European interoperable platforms, as well as the promotion of innovation by funding large-scale pilot projects. This report examines the development of digitalisation as a public sector objective to improve the efficiency of public services, the EU's digital connectivity initiatives and the development of digitalisation of public services in Member States, as well as the expected savings for citizens and businesses from using them. The results of the 2023 OECD Digital Government Index are also discussed. and the role of the World Bank GovTech Global Partnership and its implementation in Bulgaria.

Keywords: Digital government; public policy and administration; public administration

1. Introduction

During 80s of XX century digital technologies in government and for public use have changed dramatically. In 2000s digital transformation occupied a central place in the concept of modernization of the public sector. The international organizations World Bank (2002), OECD (2003), and of the European Commission (2003) defined digitalization as a means of modernization and achieving greater efficiency of governments. Information and communication technology services are already widely used by government bodies, but e-government involves more than tools. It involves rethinking organizations and processes and changing behaviour so that public services are delivered more effectively to people. Implemented well, e-government allows citizens, businesses and organizations to interact with

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government more easily, quickly and at a lower cost. During the COVID-19 pandemic e-government services has emerged as a crucial means of guaranteeing educational services, but it has also given impetus to the development of services in health care, justice and other areas of the public sector.

The international institutions introduced indices and indicators to measure aspects of digital government— the Digital Economy and Society Index (DESI), the GovTech Maturity Index, the United Nations e-Government Development Index, the WBG's Digital Adoption Index, and the Organisation for Economic Co-operation and Development (OECD) Digital Government Index.

2. The EU's Digital Decade

The key reforms for digital connectivity are supported by the European Structural and Investment Funds and the Recovery and Resilience Facility (RRF), with a focus on implementing the "Once Only Principle" by integrating electronic identification solutions into all government processes. The RRF dedicates EUR 127 billion for digital related reforms and investments in the member states under the national recovery and resilience plans.[2]

Figure 1. The EU Digital Decade

Source: Own scheme

The European Commission takes concrete actions to develop cross-border digital public services, digital public services or e-government to ensure increased efficiency of the public

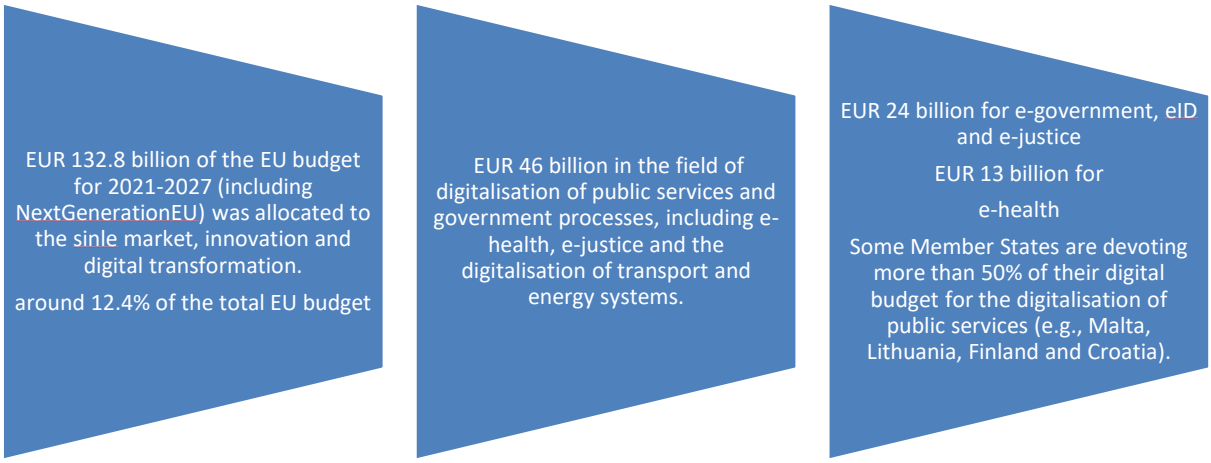
[2] EU DESI (2024), https://digital-strategy.ec.europa.eu/en

sector and savings for governments and businesses, increased transparency and better services for citizens and businesses.

Progress in the digitization of Member States' public services is uneven and favours businesses rather than citizens. A number of countries Member States are close to the target of 100% digital public services such as Denmark (98%), Finland, the Netherlands and Sweden (95%). In 2023 69% of EU citizens have interacted with public authorities online. The main digital public services that are in an advanced phase of digitization are related to online forms, online appointment booking, the availability of more modern public services still requires significant investment. Still 42% of people use e-government services to get information about laws, services, opening hours or similar, and download or print official forms, access personal information and save an appointment or reservation (Eurostat, 2024).

Thus, due to the circumstances of working and education in a digital environment, a new phase of digitalization in the EU member states started and most governments are achieving faster digitization, supported by EU financing. Digital transformation receives significant coordinated support from EU funding across the board under the EU Multiannual Financial Framework for 2021-2027.

Figure 2. EU funding for 2021-2027 for digital transformation

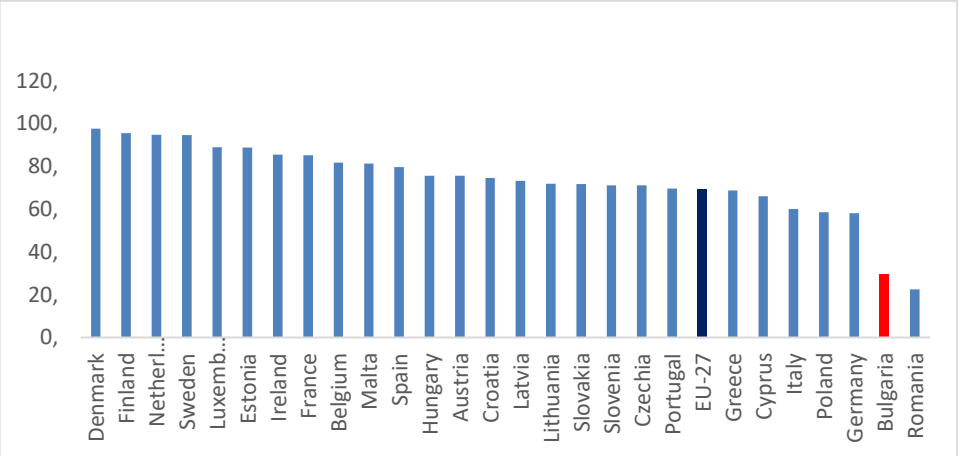


Source: Own scheme, European Commission (2024)

The use of electronic identification (eID) varies across the EU. In 2023 41% of citizens use it to access services. Denmark, the Netherlands, Finland and Sweden are again leading with over 90% and Cyprus, Germany and Bulgaria with less than 10%. In 2023 50% of 25–34-year-old

in the EU have used an eID, compared to only 25% among 65–74-year-olds (Eurostat, 2024). According to the EC's assessment, the potential cost savings are huge and can reach EUR 50 billion. Meanwhile, Italy reports that over EUR 3 billion public expenditure was obtained through electronic public procurement systems. According to statistics in Denmark, electronic invoicing saves taxpayers EUR 150 million per year, and the business EUR 50 million per year.

Figure 3. Share of Individuals' E-Government Activities Through Websites 2023



Source: Eurostat (2024)

On August 1, 2024 the European Law on Artificial Intelligence (AI Act) comes into force, which promotes the responsible development and implementation of artificial intelligence in the EU. It regulates clear requirements and obligations regarding specific uses of AI, and so it should protect the rights of citizens and businesses by reducing the administrative and financial burden. Some advanced economies have introduced various initiatives to improve their capacity to use AI in the public sector, but implementation remains a challenge in most countries. 66% of countries have used AI to improve internal processes, while only 32% have used it to improve policies.

3. E-government in Bulgaria

Bulgaria benefits from the Bulgarian Recovery and Resilience Plan allocates 23.1% of the EU funding for digital transformation (EUR 1.3 billion) [3]. According to the cohesion policy, an additional EUR 1.4 billion (13% of the total budget for the country) are allocated for the digital transformation of the country. The projects under the NRRP are devoted to measures for the

[3]The general budget for 2023 for Bulgaria it amounts to 5.7 billion EUR (after a revision of the initial budget of EUR 6.3 billion based on better GDP growth for 2021). In 2024 The EC announced an additional reduction of funds due to non-implementation of some of the measures related to changing the legislation.

development and use of innovative technologies in the public sector such as AI, blockchain, IoT and big data. As stated in the coordinated action plan, big data is the basis for developing effective AI technologies. In this regard, Bulgaria includes specific measures for the widespread use of chatbots in e-government services and the development of services that use machine learning to predict customer behaviour and facilitate the use of public services online.

In the area of digital connectivity, the National Development Program of Bulgaria 2030 aims for a free flow of data between member countries and between different sectors, ensuring the protection of personal data and consumer protection, prioritizing the key sectors of education, health care, and public administration. Construction and development of the necessary data centres; and creating conditions for open access to data and results, as well as access to large sets of databases generated by public organizations for use by businesses. A priority direction is also the provision and maintenance of high-speed and secure communication connectivity, as a basis for offering educational services through the further development of a cloud-based educational environment for the provision of services, including software as a service, infrastructure as a service and platform as a service.

In 2019, a new online platform for accessing publicly available information was launched, enabling citizens and businesses to obtain online the public information.[4] The same year the Cloud Electronic Signature was introduced, as a new means of electronic identification in addition to the existing ones (QES, personal identification code of the National Revenue Agency and the National Social Security Institute, unique access code of the National Health Insurance Fund). With the cloud signature, citizens and businesses are able to request the services provided by the administrations through a mobile smart device with internet access from anywhere in the world, 24/7, 365 days a year, which lead to an increase of public services available for citizens and businesses, but it is still much below the EU average.

[4]Bulgaria's e-Gov portal, https://egov.bg/wps/portal/egov/nachalo

Table 1. Bulgaria: Key Performance Indicators of the Digital Decade 2024

KPIs of the Digital Decade	Bulgaria			EU		Digital decade target by 2030	
	DESI 2023	DESI 2024	Annual progress	DESI 2024 (year 2023)	Annual progress	BG	EU
Digital public services for citizens	59.5	67.5	13.4%	79.4	3.1%	100	100
Digital public services for business	80.8	91.9	13.8%	85.4	2.0%	100	100
Access to electronic health records	77.2	77.2	0.0%	79.1	10.6%	100	100

Source: EU Digital Decade (2024), DESI – Digital Economy and Social Index

Although Bulgaria continues to perform well in terms of fixed gigabit connectivity, its 5G coverage remains below the EU average. The uneven distribution of digital infrastructure in sparsely populated, remote and rural areas also needs further attention. The use of electronic identification (eID) for e-public services is still below 10% of total citizens. Bulgaria should promote favourable conditions for the successful digitalization of SMEs in order to encourage technology transfer and accelerate the entry of new technologies.

4. The World Bank's Global GovTech Partnership

At the end of 2019 The World Bank's Global Governance Practice (GGP) launched the GovTech Global Partnership (GTGP). The aim is to enable the public sector to keep pace with new technologies to strengthen digital governance in the public sector, as well as government efforts to engage with relevant stakeholders to promote digital transformation. Stakeholders in the digitization process are start-ups, multinational technology enterprises, freelance experts, development partners, academia, civil society and other entities that are part of the GovTech space. This partnership supports beneficiary countries through a wide range of activities such as advancing and sharing knowledge and best practices, providing capacity building and knowledge exchange programmes, offering technical advice to member countries and supporting pilot solutions.

The GovTech Maturity Index (GTMI) measures the key aspects of four GovTech focus areas, supporting core government systems, enhancing service delivery, mainstreaming citizen

engagement, and fostering GovTech enablers. The GTMI is constructed for 198 economies based on consistent data sources, and thus is considered the most comprehensive measure of digital transformation in the public. The latest data are for 2022 and most of the advanced economies in the EU are with index close to 0,9 (between 0,75 and 1 are leaders), while Bulgaria with 0,681 is ranked as “high” (between 0,5 and 0,75).

Bulgaria's efforts for digitalization are to align with the EU’s data strategy, which aims to make more data available for use in the economy and for society, while ensuring that European privacy rules, data protection and competition are fully respected. The World Bank and the Government of Bulgaria have been partners in e-government reforms and digital transformation for many years. In 2024 the World Bank started a new analytical and advisory support to the Bulgarian Ministry of e-Government to strengthen the strategic, organizational and technical foundations for data management and data spaces. Based on this partnership, the strategic, organizational and technical foundations will be elaborated for data management and data spaces, including conducting an assessment of data management, availability of data and data quality in public administration in accordance with relevant EU legislation.[5]

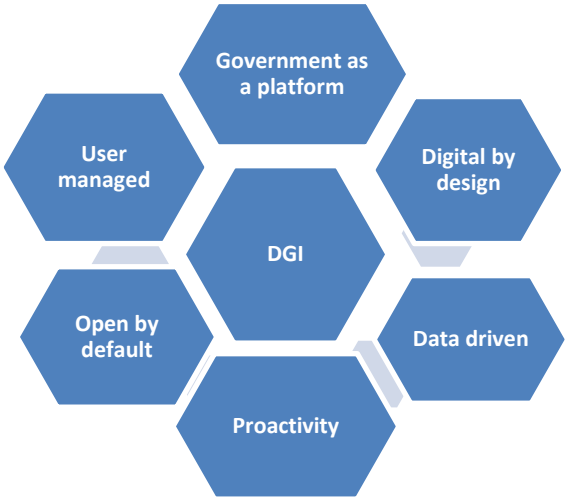
5. The OECD Digital Government Index

Solid foundations for a sustainable and long-term digital transformation of the public sector include establishing governance mechanisms that can adapt to the rapidly changing digital environment. This governance must be based on a digital governance strategy that sets a common vision and goals for the whole of government and provides the opportunities to deliver quality public services. These foundations should also include a reliable and sustainable digital public infrastructure, including digital identity, digital payments, digital mail, data sharing systems, among others. Many governments have developed these systems and tools under their "Government as a Platform" approach. They are essential to ensure consistent digital transformation at scale, promote responsible use of government data and facilitate inclusive access to services. The DGI assesses countries' digital governance by looking at the extent to which they have the necessary foundations in place to be able to use data and technology to

[5]World Bank (2024). PRESS RELEASE No: 2024/ECA/107, https://www.worldbank.org/en/news/press-release/2024/05/20/the-world-bank-to-support-bulgaria-on-data-management

deliver end-to-end governance and people-centred digital transformation of the public sector. These foundations are identified in the provisions of the OECD Recommendation of the Council on Digital Governance Strategies (OECD, 2019) and the six dimensions of the OECD Digital Government Policy Framework presented in the below figure.

Figure 4. Dimensions of the OECD Digital Government Index



Source: OECD Council Recommendation on Digital Governance Strategies (OECD, 2014)
Note: DGI - Digital Governance Index

The OECD's Digital Governance Index (DGI) compares the efforts made by governments to create the foundations needed for a coherent, people-centred digital transformation of the public sector. The OECD's Digital Governance Index (DGI) assesses the efforts made by governments to create the foundations needed for a digital transformation of the public sector that is coherent and people-centred. Based on the pilot exercise conducted in 2020, DGI serves as a resource for policymakers to support comprehensive policy reforms in the digital transformation of government to increase government productivity, improve government services and improve people's lives.

In addition, DGI's 2023 study includes questions on emerging policy areas prioritized by governments in their national digital governance agenda. These include digital public infrastructure (eg digital identity), the use of artificial intelligence (AI) in the public sector and strategic partnerships with the private sector, including GovTech. Top performing countries in the DGI for 2023 are Korea, Denmark, the United Kingdom, Norway, Australia, Estonia, Colombia, Ireland, France and Canada. These countries demonstrate a comprehensive approach

to providing sound foundations for digital governance with a balanced performance across the six dimensions of the index. Germany, Greece, Slovakia, Switzerland and the USA are not represented.

6. Conclusion

The approach to digitalisation in the public sector in member states is changing, with digital public services moving from creating public services for individual public systems to a single portal for public services. Thus, more and more citizens are using electronic identification (eID) should be able to use digital public services of various public institutions, and the administrative burden for businesses should decrease. The full digitalization of public services and cross-border digital public services in the EU by 2030 would allow the EU citizens and business to use them 24/7, 365 days a year within the EU.

The benefits of the digitization of public services are also for the governments themselves, as this increases the efficiency and productivity of public institutions in serving businesses and citizens, ensuring direct use of public services without direct contact with employees, which facilitates communication in the organizations themselves and between them, and facilitates more impartial decision-making based on an independent evaluation of documents and regulations.

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HOW ANCIENT CHINA FAILED TO DEVELOP A CREDIT MONEY SYSTEM?

Shouyi, ZHANG[1]

Abstract: *2023 was the millennium since the birth of the paper money, the Jiaozi, which was issued in Northern Song dynasty. Paper money in China was invented hundreds of years ahead of Western Europe. However, China did not have a credit money system, due to the influx of silver from South America in the 16th century changing the course of history. This paper finds that, behind the "Great Divergence" between East and West, the most neglected answer is from a financial perspective.*

Keywords: *Paper Money; Money Shortage; Monetary System.*
JEL: *E42; N15; N45.*

1. Introduction

The British historian of science, Joseph Needham, in his work *Science and Civilization in China* published in 1954 (Preface to the first chapter of the first volume), raised a famous question: In the 1st-15th centuries A.D., China's science and technology were far ahead of those of Europe, but when Europe gave birth to modern science after the 16th century, why did China's science stagnate? This question was extended to the economic field: why did China's economic development lead Europe before the 16th century, but lagged Europe since then, and even declined to the point that it was completely reduced to semi-colonial status after the Opium War?

Since Needham raised that famous question, the academic literature on the subject has been voluminous. In several universities in California, the California School of History has even emerged to study the "Great Divergence" between East and West. Throughout these studies, for Needham's mystery or the Great Divergence, there are several types of explanations, such as cultural philosophy, political system, economic model, climate, and geography, etc. Although there is some truth in these explanations, it exists a knot that cannot be circumvented: cultural philosophy, political and economic system, and climate and geography in ancient China, they all did not take a major turn around the 16th century, so why did these conditions correspond to prosperity before the 16th century, but to decline after the 16th century?

2. Money Shortage as a Common Problem

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In both the East and the West, from ancient to modern times, the rise and fall of nations have been constrained by one fundamental problem: money shortage. In times of peace, the economy flourishes, but the lack of materials' resource makes the growth of money unable to keep up with the growth of the economy, and there is always the risk of deflation; in times of war, the urgent need to raise funds for the war makes the money shortage even more serious.

In Western Europe, the minting coins appeared during the era of the Greek city-states in the 7th century BC, roughly the same time as the emergence of government minting during the Eastern Zhou dynasty in China. From the thriving city-state economies of Athens and Sparta before the Peloponnesian War to the later Hellenistic states, there were scattered city-states and kingdoms with a chaotic coinage system, but this also allowed for an extraordinarily thriving money-changing sector. In 450 BC the Roman Republic enacted the Law of the Twelve Tables (*Lex Duodecim Tabularum*) and began minting silver and copper coins. As the Roman Republic expanded and eventually evolved into the vast Roman Empire in 27 BC, centred on the Mediterranean and spanning Europe, Asia and Africa, the minting of coins became unified.

The Roman Empire was in danger of the money shortage. In addition to the lack of coins, resulting in the empire's internal minting insufficient, the Roman Empire has been a deficit situation in the Silk Road through the trade with the East. The outflow of gold and silver had caused the Roman emperor's concern. In 476 A.D., the Western Roman Empire fell, money shortage has been greatly alleviated, and even once was completely solved. In the dark Middle Ages from 5th century to 15th century, Western Europe prevailed in the feudal system and serfs as the main labour force of the manor economy. This system was a great regression comparing with the centralised system of counties in China since the Qin dynasty or the previous system of the provinces in Roman Empire, so that the commercial activities have shrunk considerably. Especially in the early Middle Ages, money even disappeared as there was only agriculture and no commerce at all. That is why Engels thought that money had almost no place in the typical feudal economy of the early Middle Ages.

By the late medieval period of the 13th and 14th centuries, many self-governing cities were born outside the feudal manorial economy, independent of the feudal lords. These cities ruled by merchants issued city charters demanding personal freedom, land freedom, financial and trade freedom, and even formed city alliances (e.g., the famous Hanseatic League) to fight against the feudal lords and promote commercial development. Especially after the end of the 13th century, nation-states such as Portugal, Spain, Holland, England, and France came into being one after another, and under the inspiration of the Renaissance, the feudal lords and religious forces were greatly weakened. Europe's commerce once again stepped into prosperity and was even called the commercial revolution.

The commercial revolution awakened the spectre of the money shortage of a thousand years ago and made the problem even worse. Although papermaking and printing had become widespread by the late 15th century and gave a great impetus to the Renaissance movement, paper money did not emerge as it did in China during the Northern Song dynasty. One possible reason for this is that in divided Europe, the basic conditions for issuing paper money did not exist: a unified government and treasury.

As in the case of the Greek city-states before the Roman Empire, all European countries minted their own gold, silver, and copper coins. Copper coins are inconvenient to carry, such as Sweden once minted up to 20 kilograms of copper *Plåtmynt*, can only be used in internal trade, but foreign trade with silver and gold. Like the Roman Empire, Gold and silver loss coupled with the wear and tear of coins, made Europe meet a serious money shortage in the 15th century due to a large deficit in the trade with East. Spanish colonists at the time said that they Spaniards are suffering from a heart disease, which can only be cured by gold.

3. European Solution for Money Shortage

In emerging nation States, the money shortage led to the rise of mercantilism. Both early mercantilism, from the 15th to the mid-16th century, and late mercantilism, from the second half of the 16th to the 17th century, regarded money as the only form of wealth. Mercantilism not only became the dominant school of economics at the time, but also turned into a specific state policy. The Austrian judges summarised nine national policies in the Mercantilist Manifesto issued in 1684, including minimising imports to save gold and silver, exporting as much as possible to gain them, and promoting domestic manufacturing. Mercantilism is, in essence, economic statism, and this policy was widely used in the later British Empire, Germany in the late 19th century and even the emerging East Asian economies after the Second World War.

The ultimate solution to the problem of money shortage was the Great Discovery. The purpose of the voyage was very simple, in addition to the search for traditional luxury goods such as silk and spices, it was to search for gold and silver in the Orient, where it was said that gold and silver were found everywhere. The Great Discovery began in the 15th century, two competing countries - Portugal and Spain. In 1487, the King of Portugal funded Diaz round the Cape of Good Hope, the southernmost tip of Africa, discovered the Indian Ocean route. In 1492, when the Emperor of Ming dynasty in China imposed a ban on the sea, Columbus set off westwards with a letter from the Queen of Spain to the Emperor of China and discovered the New World of America. From then on, history began to turn the page.

The Great Discovery of the 15th century brought huge quantities of gold and silver to the West, and the monetary system of Western Europe was able to make a gradual transition from the silver standard and the gold-silver compound standard to the gold standard, which had a stable value. However, no matter what the coinage was, money was not the real wealth of the whole

society, capital was. The fundamental impact of the Great Discovery on Western Europe was the establishment and improvement of a modern financial system, which enabled the expansion of government credit and private sector credit at the same time, and the expansion of credit promoted the rapid accumulation of capital, which led to the outbreak of the Industrial Revolution in Europe, which was originally technologically backward continent than China.

4. Chinese Solution for Money Shortage

In ancient China, since Shang dynasty, official money was the government minting of coins. During the Spring-Autumn and Warring-States Periods, all the vassal states used copper as raw material, and each of them minted their own currencies, such as the *Bu* (shovel) coins of the State of Chu, the *Dao* (knife) coins of the States of Qi, Yan and Zhao, and the *Yuan* (wafer) money of the State of Qin. After the destruction of the six states, Qin unified the coinage system, using gold as the upper coinage, and unified casting of copper coins with round outside and square inside – *ban liang* – half a tael of money. In the case of scarcity of gold and silver, the coinage materials for minting coins since Qin were base metals such as copper and iron in larger quantities. But even so, the money shortage has been plagued by successive dynasties.

There are two reasons for the money shortage: firstly, the money shortage caused by economic development. During the Han, Tang, and Song dynasties, which lasted for a thousand years, the economy was very prosperous. However, due to the scarcity of coins, the number of coins minted could not keep up with the requirements of economic development, so that there was often a risk of deflation; secondly, the money shortage caused by war, that is, the urgent need for the government to raise funds for war. It is generally thought that China after the Qin dynasty was characterised by unification, peace and centralisation of power, but in fact, wars have permeated Chinese history. Apart from the 400-odd years of division during the Three Kingdoms, Wei, Jin, North and South Dynasties and the Five Dynasties and Ten Kingdoms, wars were commonplace even in relatively united and economically prosperous dynasties such as the Han and Tang dynasties. For example, 501 wars were fought during the 425 years of the Han dynasty, an average of at least one war per year. As for the Song dynasty, which was divided between the North and the South, wars were even more frequent: from 960 A.D., when Zhao Kuangyin established the Northern Song dynasty by the Chenqiao Mutiny, to 1279, when the Southern Song Dynasty was destroyed in the miserable Yashan Sea Battle, a total of 549 wars took place in a period of 319 years.

The official response to the money shortage caused by economic development was to allow private minting. In ancient China, there were no regulations on the use of gold, silver, cloth and silk, which were used in small quantities for large transactions. Even for private minting, the government turned a blind eye during the period of recuperation and economic development. For example, in the early Han dynasty, during the 50-odd years from Emperor Gaozu to

Emperor Jingdi, who believed in the doctrine of Laozi, the government did not intervene in economic activities and even gave up the right to mint money to the private sector. In the middle stage of Tang dynasty, the phenomenon of private minting of money was always serious. During the reign of Emperor Xuanzong of the Tang dynasty (734 A.D.), due to the shortage of official minting, Chancellor Zhang Jiuling once suggested that private minting should not be banned, but permission was not granted. However, due to the economic prosperity of the Tang dynasty, which was so prosperous that the court could rely entirely on tax revenue for its expenses, the Tang dynasty adopted a long-standing policy of acquiescence to private minting, restricting at most the minting of coins that were of too low a quality.

Another way to deal with the money shortage caused by economic development is to reduce the use of money. The first was to abandon the official use of minted money to collect taxes. Before the Song dynasty, taxation in kind was very common, but there was also the experience of introducing currency taxation. For example, in 780 A.D., during the reign of Emperor Dezong of the Tang dynasty, a two-tax law was implemented, requiring the payment of taxes in coins, which exacerbated the short-supply of currencies and caused a sharp drop in the price level. In the 40 years to 821 A.D., the price of a bucket of rice fell from 200 to 50 Wen, and the price of a silk from 4,000 to 800 Wen, finally necessitating the abolition of coin taxation. A more extreme approach to reducing the use of money was to prohibit its use by the people as a store of value. In the late Tang dynasty, in response to the shortage of money supply, a policy of "forbidding the storage of money" was introduced, which stipulated that the people were not allowed to store money, and that if they held money for more than a certain period, they had to spend it, or else they would be confiscated and convicted. This initiative was contrary to the function of money as a store of value and naturally ended in failure.

In contrast to the above, the official response to the war-induced money shortages was less peaceful. Firstly, they reduced the purity of the official coins and raided the minting tax. For example, after Wang Mang's usurpation of power at the end of the Western Han dynasty, he changed the coinage system four times in eight years, leading to great confusion in the monetary system. Although Wang Mang prohibited private minting of coins and even the possession of copper and carbon for minting coins by the private sector by means of harsh laws, it was still to no avail. During the divided Northern and Southern Dynasties, the indiscriminate minting of official currency was so excessive that the official minting of coins at that time was described as "thin and small in form, with an unsuccessful outline", and the indiscriminate minting of official coins in turn further incentive for even lower quality coins, which were "even thinner than the elm pods", and capable of floating on the water.

5. The millennium of Paper Money and the Shackles of Silver

Papermaking and printing have been recognised as having greatly facilitated the spread of knowledge, but the impact of these two inventions on the monetary system has been overlooked. It was due to the invention of paper and printing that China entered the era of a cash-based paper money system in 1000 A.D. and was at least 500 years ahead of Western Europe in terms of its monetary system.

The Song dynasty is after the Han and Tang, another commodity economy boom era, at the same time, fought wars frequently with Liao (Khitan), Jin (Jurchen), and Mongolia in the North China. Therefore, the money shortage problem of Song dynasty is also extremely serious. Northern Song Dynasty, gold and silver reserves are very small, furthermore, copper coins are lost in large quantities to surrounding neighbours such as Khitan, Jurchen, Japan, and Annan (Vietnam). To solve the shortage problem of copper coins, the official cast iron money. As iron money was inconvenient to carry around, the paper currency Jiaozi, which represented the circulation of iron money, was born in Sichuan. The private currency facilitated market transactions, but there were many cases in which the currency could not be honoured. After hearing several cases, the government discovered the benefits of paper money. In 1023 A.D., the Northern Song dynasty established the Yizhou Jiaozi Service in Sichuan, specialising in the issuance of Jiaozi, while forbidding private printing.

In the beginning, the issuance of the official Jiaozi was orderly. Minted coins as a reserve, every three years for a "term" to issue Jiaozi, and the Jiaozi of previous term must convert into new version. But to the end of the Northern Song dynasty, during Huizong period, because of the need to raise funds for the war, the issue of Jiaozi increased greatly. In 1107 A.D., the issuance of Jiaozi exceeded 20 times of the original issuance amount. In this year, the Jiaozi was renamed as "money draft" (Qianyin in Chinese pronunciation). At the end of the last term of Jiaozi, four Jiaozis could convert into one money draft. After that, it was stipulated that the previous Jiaozis would not be converted, so it became a waste of paper.

Forty-six years after the issuance of Jiaozi, in 1069 A.D., the Northern Song dynasty started the reform directed by Wang Anshi, which was mainly composed of the Equalized Transport System (Junshu Fa), the Market Exchange Law (Shiyi Fa), and the Low Interest Agricultural Loan Policy (Qingmiao Fa). The Song dynasty before the reform had the most developed State-Run Monopoly System, not only continued the salt and iron monopoly system of the Qin and Han dynasties, but also prohibited the private sector from operating various necessities of life, such as wine, vinegar, tea, alum, and alkali, etc. The reform further strengthened the state-monopoly system. The government monopolised the purchase of important materials by Equalized Transport System, forestalled the sale of commodities by Market Exchange Law, and unified the lending of money to farmers to finance spring ploughing and sowing by Low Interest

Agricultural Loan Policy. However, the first two struck down the industrialists and merchants, and the last did not benefit the peasants either.

The Southern Song dynasty continued to use paper money, which was called "Guanzi" and "Huizi" and was issued by the Hubu (Ministry of Revenue and Household Affaires). As in the Northern Song, the issuance of paper money effectively solved the problem of money shortage faced by economic development in peacetime, but still facilitated the indiscriminate issuance of government in times of war. In the first year of the Qingyuan period (1195) of the Southern Song, in order to cope with the needs of the war with the Jin, the issuance of Huizi was massive, which triggered hyperinflation. Although the Southern Song made several attempts to stabilise the value of the currency by exchanging gold and silver for Huizi (known as Chengti, weight-based exchange), they were unable to do anything about it. Parallelly, the Jin, which was at war with the Song, also relied on the issuance of paper money (called Jiaochao) to finance the war, and the same hyperinflation occurred.

The short-reigned Yuan dynasty (Mongol of Kublai Khan) inherited and developed the paper money system of the Song. The paper money system of the Yuan mainly included: firstly, stipulating that the issuance preparation of paper money was based on gold and silver, of which silver was the main one, and issuing paper money called "Zhongtong Yuanbao Jiaobao"; secondly, setting up a special paper money management agency under the Ministry of Hubu; thirdly, promulgating a paper money management regulation and strictly prohibiting the printing of paper money by the private sector; fourthly, stipulating that gold and silver were not allowed to circulate in the market; fifthly, all taxes could be paid in paper money. Compared with the gold standard which appeared until 18th century, the paper money system of the Yuan was already quite perfect - of course, unfortunately, the Yuan had not yet established a central bank independent of the treasury, and the management of paper money issuance was still managed by the Ministry of Hubu, which means the amount of currency issued depended on the needs of the treasury. In the later part of the Yuan, due to the war, the issuance of paper money constantly exceeded the limit of reserves. At the end of the Yuan, there was even a situation where "people ate people, and paper money bought paper money".

6. Impact of Silver Inflow and Silver Empire

At the beginning of the Ming dynasty, a monetary system was implemented in which both copper coins and paper moneys were used. In 1374 A.D., the Department of Baochao was set up to issue the "Daming Tongxing Baochao" (Universal Circulating Paper Money of Great Ming), which stipulated that three-tenths of the tax payment should be made in coins and seven-tenths in paper money and prohibited the use of gold and silver. Soon after, the use of coins was banned, and a purely paper money system was introduced. However, the value of the paper money depreciated sharply as the issuance continued to rise. In 1375 A.D., the second year of

the establishment of the Department of Baochao, the paper money in one guan (unit of coins) was worth 1,000 wen (unit of coins, piece) of copper coins, and by 1432 it had depreciated 200 times and was worth only 5 wen of copper coins. The depreciation of paper money, coupled with the opening of the European Sailing Age of Discovery, a large amount of silver began to be imported into China. In addition to the continued use of copper coins, the private sector accelerated the replacement of paper money with silver.

In 1581, 90 years after the discovery of the American continent by Columbus, Zhang Juzheng, the chief minister of the imperial cabinet, implemented the "one whip law", which stipulated that all taxes and corvée services should be paid in silver, so that paper money was withdrawn from circulation, and the Ming Dynasty formally entered the era of the silver-based standard. Since the official minted copper coins are still used in small transactions, the monetary system should be more accurately described as silver-copper compound standard. In any case, from the paper money system to the quasi-silver-standard is a regression of the monetary system. Moreover, the Ming dynasty did not unify the minting of silver coins, but rather allowed the circulation of silver ingots or bullion of various sizes, which needed to be weighed and assessed for their purity when in circulation. Therefore, this shift was in fact a direct regression from credit money to the private material money in the Shang and Western Zhou dynasties 2,000 years ago.

The "one whip law" was implemented smoothly. It did not trigger a money shortage and serious deflation as the "two-tax law" of the Tang. This lies firstly in the increase in domestic silver production and silver imported from Japan, the second is more because of the huge amounts of silver inflow from the Americas after the European geographic discovery. It is recorded that the average annual silver production in the Americas reached 170 tonnes in the 16th century, rising to an average of 420 tonnes in the 17th century, and further to an average of 740 tonnes in the 18th century. Seventy per cent of the silver from the Americas was imported to Europe, and then 40 per cent of it was imported to China through trade, i.e. almost 200 tonnes of silver per year. There is a comparison to show the amount of silver imported to China at that time: compared to the 15^{th} century, China's GDP is now about 1,000 times higher than it was at that time, whereas China's silver production (a few thousand tonnes per year) is only 30 times higher than the amount of silver imported at that time.

During the silver standard era, China's economy was integrated into a global monetary trading network that was run by Europe. Europe took slaves from Africa, transported them to the Americas to mine gold and silver, and then imported silver into China (after the Opium Wars, opium from India partially replaced silver). The silver imported into China was on the one hand for the purchase of commodities in which China had a long-term comparative advantage, such as silk, porcelain, tea, etc. On the other hand, the price ratio between gold and silver in China was higher than that in Europe after the implementation of the silver standard in European

countries, and the export of silver from Europe to China was also for the arbitrage purpose of exchanging it for gold. Part of this gold was used for trade with other regions (e.g., India), and the other part contributed to the later establishment of the gold standard in Europe.

7. Remarks

The dependence on silver meant that the Ming dynasty gave up the monetary control it had had since the Qin dynasty. It allowed the external import of silver, or exogenous monetary supply, to dominate economic operations and even dynastic turnover. The amount of silver imported to Asia by the Dutch East India Company, for example, rose from 7 to 13 tonnes of pure silver per decade from 1602-1629, but suddenly dropped below 9 tonnes from 1630 onwards. The decline in silver inflow at the end of the Ming caused severe deflation and economic depression, which accelerated the fall of the dynasty. It is said that a few months before Li Zicheng attacked Beijing, one officer, Jiang Chen, suggested to the last emperor of the Ming to issue paper money, but it was too late, and the emperor hanged himself from a distorted tree in Jingshan Mountain in 1644 behind the Forbidden City.

Looking back at China's nearly five hundred years of silver-based standard era, first the Ming and Qing dynasties changing, then the economic and financial crisis caused by the silver-copper value imbalance, and then after the Opium War, an industrialisation movement without the support of a financial revolution, until the Sino-Japanese Sea War, the Qing dynasty completely failed. In 1935, the United States of America's Silver Act once again triggered a crisis of massive outflow of silver, and the Republican government eventually abandoned the silver standard, returning China's monetary system to the paper money of 500 years ago.

Dutch Disease is a term in economics to describe the metamorphosis of the industrial structure. In the 1960s, the Netherlands discovered large quantities of oil and gas, and the export of oil and gas brought huge revenues. However, the boom in the oil and gas industry squeezed other manufacturing industries, and the shift in industrial structure towards the oil and gas industry resulted in a decline in labour productivity and a stagnation of technological progress in the manufacturing sector. Silver imported into ancient China caused a serious case of Dutch disease.

It is recorded that at the end of the 16th century, China was able to obtain huge quantities of silver every year in its trade with Portugal and Spain, but "they [China] sell goods but do not buy anything, so that the silver, once it enters their hands, never leaves them." The same result can be seen in the trade between the British East India Company and China in the mid to late 17th century, where precious metals consistently accounted for two-thirds of the East India Company's exports to China, and even as much as 87 per cent in the period 1680-1689, the beginning of the last peak (Kang-Qian Shengshi, a age named by the reigning title of Kangxi and Qianlong in abbreviation, 1662-1795 with Kangxi, Yongzheng, and Qianlong three

emperors) of economic prosperity in ancient China. Silver imported from the West to buy the traditional Chinese agricultural handicraft products, such as tea, silk, porcelain and so on. Thus, as in the case of the Netherlands, where oil and gas were discovered, the export of traditional agro-industrial products could be easily exchanged for silver, the social economy became old-fashioned, and the economic structure was no longer upgraded.

European scholars have also admitted that without the transformation of early modern China into a silver-based society, there would not have been the rise of European powers such as the Spanish empire, because Spain and even the subsequent British empire made their fortunes by exporting silver to China. If the initial paper money system could be insisted and well operated, China in the Sino-European trade would not accept the silver hard-earned by European, which would possibly change the historic trend and international pattern of modern World. When we further examine the silver shackle of China in the historical background, an inherent institutional flaw and a stagnated man-ruling governance destine to economically collapse.

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THE IMPORTANCE OF MONITORING PUBLIC FINANCES

WHY EFFICIENCY MATTERS AND HOW THE POPULATION IS DIRECTLY AFFECTED BY THE STATE'S DECISIONS

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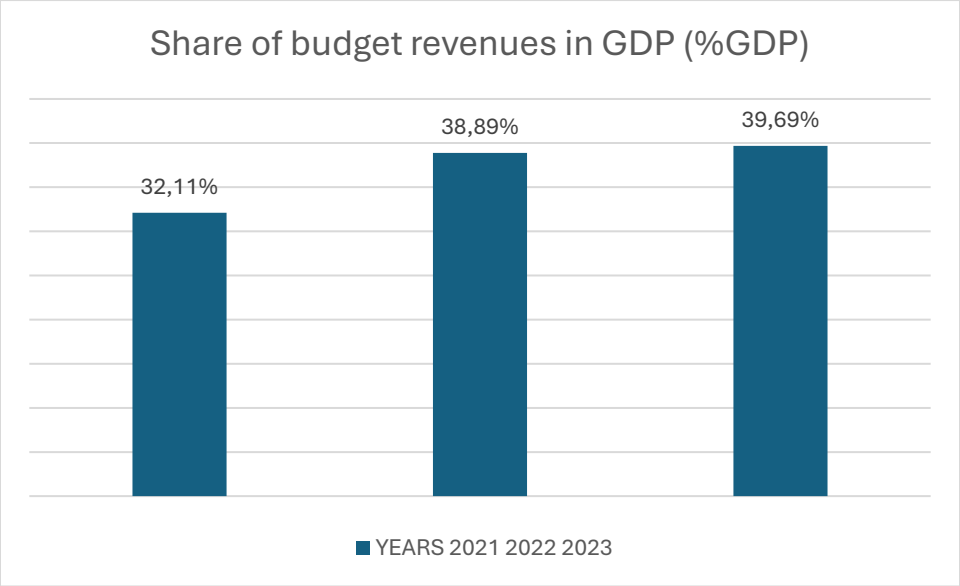
1.Abstract

The analysis of public finances in Estonia, Cyprus and Belgium highlights significant differences in the tax structure, public spending and debt sustainability. Estonia stands out for its prudent fiscal policy, with the lowest level of public debt in the EU. Cyprus, hit by the 2013 financial crisis, has implemented reforms to stabilise finances but still faces economic vulnerabilities. Belgium, with a large public sector, has high public debt but benefits from a diversified economy. Taxation is lower in Estonia, attracting investment, while Belgium has higher taxes to support social services. Cyprus adopts a mixed strategy, with favourable taxes for companies. The differences reflect distinct economic models and varying approaches to financial sustainability.

Keywords: *public finances, tax structure, public spending and debt sustainability, public debt, economic vulnerabilities, economy, economic models.*

2.The public finance situation of Estonia

This analysis focuses on the state of Estonia's public finances in the period 2021-2023. Regarding budget revenues, they recorded a slight increase in the analyzed period, from EUR 12.3 billion in 2021 to EUR 14 billion in 2022, then to EUR 15.2 billion in 2023, but in real terms, budget revenues recorded a decrease of 4.71% in 2022, respectively of 0.77% in 2023. This decrease in budget revenues in real terms occurred because the nominal increase in budget revenues was lower than the increase in prices during the analyzed period.



Source: Ameco

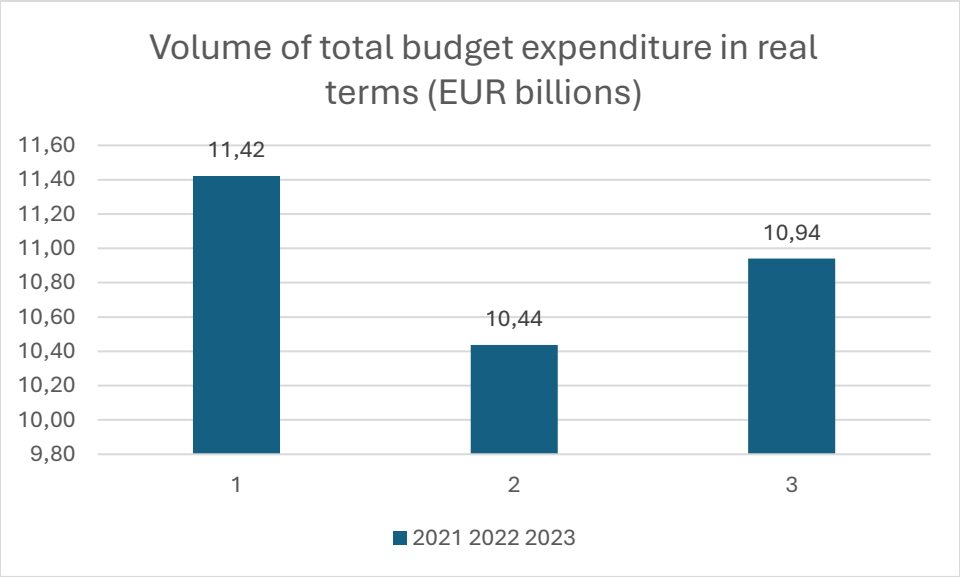
Unlike revenues, budget expenditures recorded a more pronounced increase in 2023 (14.69% compared to 8.57% in the case of budget revenues). Average budget revenues/capita. recorded a slight increase, from EUR 10379.6/capita. (in 2022) to 10987.42 EUR/capita (in 2023), and average budget expenditures/capita also recorded an increase in 2023 by 1252.83 EUR compared to 2022. Average budget expenditures/capita recorded a more pronounced increase compared to average budget revenues/capita, which may be due to the Covid-19 pandemic, which affected both revenues, but, to a greater extent, affected the budget expenditures of all states.

Budget expenditures had a higher share in GDP during the analyzed period, compared to budget revenues (41.99% compared to 32.11% in 2021, 39.72% compared to 38.89% in 2022, 42.82% compared to 36.69% in 2023). We also note that in 2022, budget revenues had a slower growth than GDP, and in 2023 they had a somewhat stronger growth than GDP.

This is shown by the size of the elasticity coefficient which is sub-unit in 2022 (0.9) and super-unit in 2023 (1.34). As for budget expenditures, they also recorded a slower growth than GDP in 2022 and a stronger growth than GDP in 2023, the size of the elasticity coefficient being 0.60 in 2022, and 2.30 in 2023. Regarding the structure of budget revenues, indirect taxes had the highest share throughout the analyzed period, although they decreased in 2023 compared to 2022 (34.15% in 2021, 34.29% in 2022 and 33.55% in 2023).

Regarding the structure of budget expenditures, in terms of economic classification, social transfers had the highest share throughout the analyzed period (27.48% in 2021, 27.97% in 2022, 28.05% in 2023). From the point of view of the functional classification of budget expenditures, social protection had the highest percentage in both 2021 and 2022 (32.01% and 31.91% respectively).

Both categories had the highest share in the analyzed period, amid the Government's support for the population in overcoming financial difficulties caused by the Covid-19 pandemic. Also against the backdrop of the Covid-19 pandemic, the Estonian Government has turned its attention to the "Health" category, occupying the second position after the allocated share of budget expenditures in both 2022 and 2023 (15.62% and 15.01% respectively).

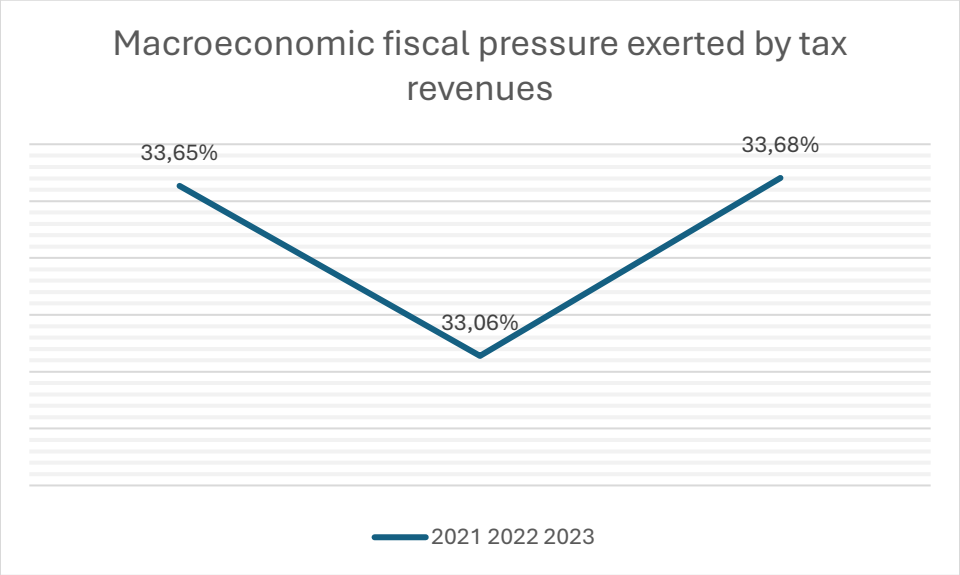


Source: Ameco

As for fiscal pressure, that exerted only by indirect taxes (VAT, excise duties) has the highest percentage in all 3 years analyzed (13.46% in 2021, 13.33% in 2022, 13.32% in 2023) compared to direct taxes (8.33% in 2021, 8.06% in 2022, 8.09% in 2023) and social security contributions (11.86% in 2021, 11.67% in 2022, 12.27% in 2023).

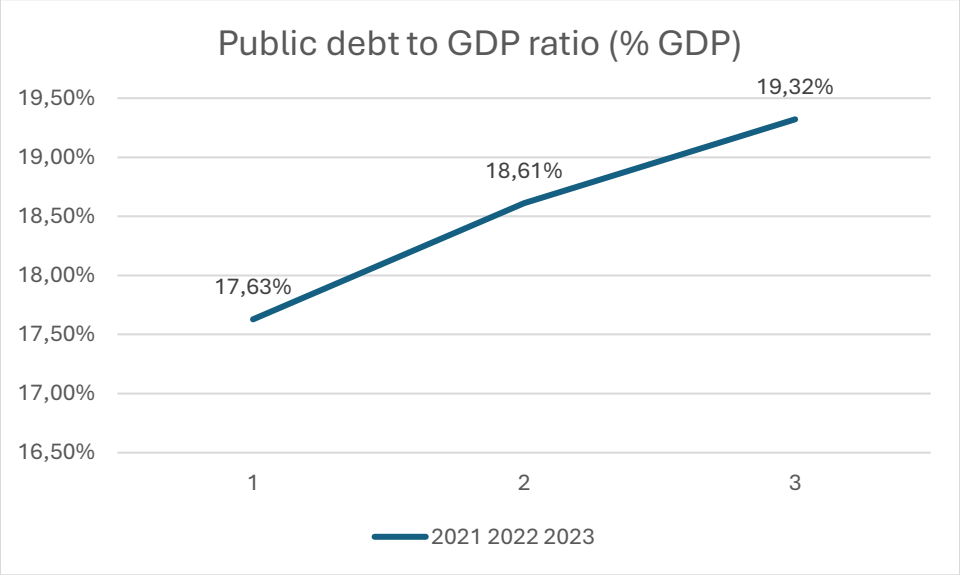
Throughout the analysis period, there are no major changes in the fiscal pressure in any of the mentioned categories. Regarding the marginal tax rate, it increased in 2023 compared to 2022 in all analyzed categories except indirect taxes, where Rmg remained constant. The highest tax rate among all the targeted categories was had by indirect taxes (0.13) in 2022 and social security contributions (0.22) in 2023.

Regarding the budget balance, Estonia recorded a budget deficit in all three years of analysis (2021, 2022, 2023), but it decreased by 0.43% in 2022 compared to 2021 and by 0.17% in 2023 compared to 2022. The new values of the budget balance in 2022 and 2023 (-2.78%, -2.71%) is below the maximum accepted threshold of -3% GDP, which means that the Estonian economy is starting to stabilize.



Source: Ameco

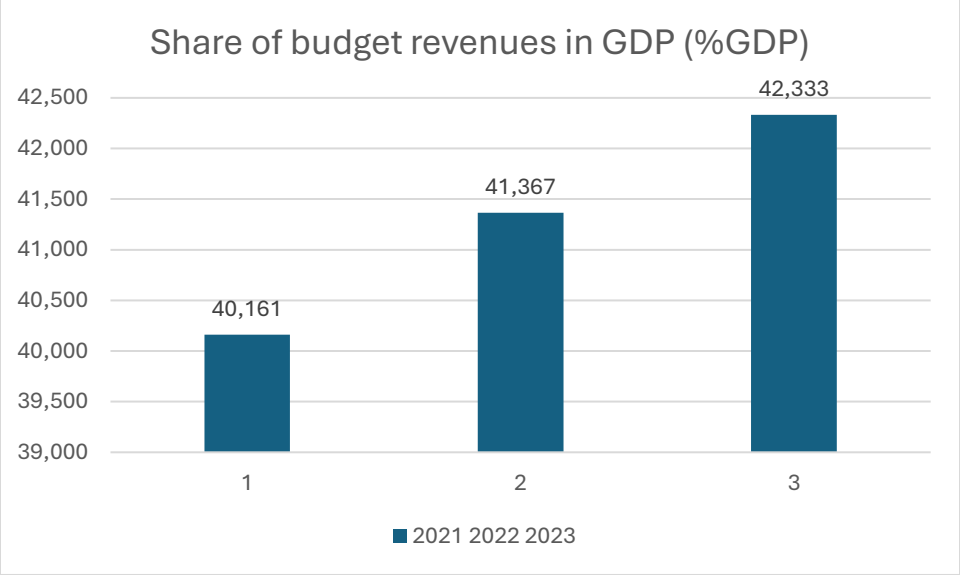
At the same time, Estonia recorded a public debt of: 17.63% GDP in 2021, 18.61% GDP in 2022, 19.32% GDP in 2023. We note that Estonia's public debt increased in 2022 compared to 2021 by 0.98%, and in 2023 compared to 2022 by 0.71%. This increase in public debt occurred against the backdrop of high budget expenditures compared to budget revenues, the main cause of these changes being the effects of the Covid-19 pandemic felt in the Estonian economy.



Source: Ameco

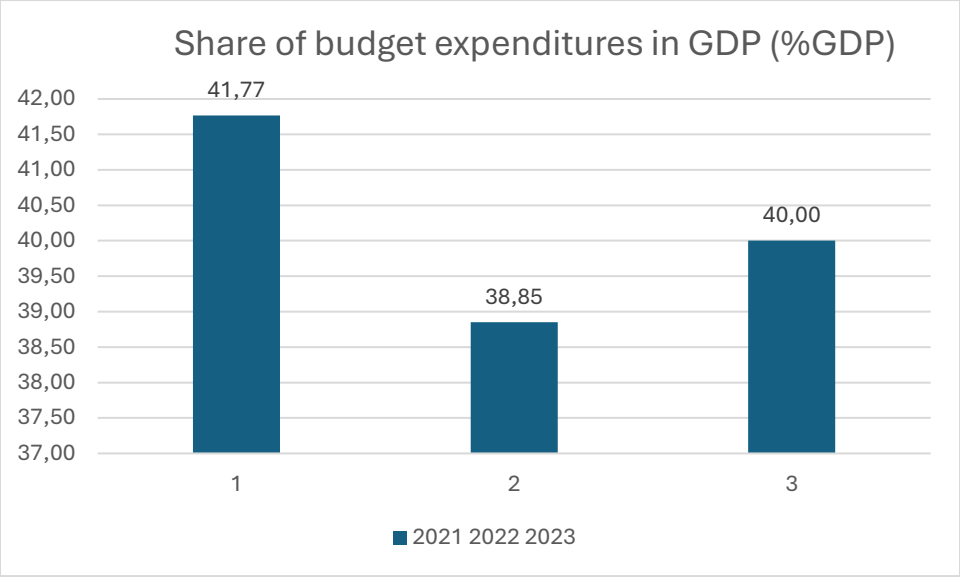
3.The public finance situation of Cyprus

During the analyzed period, the main effect on public finances was manifested through a very slight year-on-year increase in budget revenues in both nominal and real terms. It can be seen that the percentage change in VB in nominal terms in 2022 was 15% compared to the previous year, and in 2023 it was 10.435% compared to 2022. The share of VB in GDP increased by 1.2% in 2022 compared to 2021, and in 2023 it increased by 0.96% compared to 2022. Average income per capita increased by approximately 1,500 euros in 2022 compared to the previous year, and in 2023 they increased by approximately 1,100 euros compared to 2022. At the same time, budget revenues in real terms in 2022 increased to a lesser extent, by 6.34% compared to 2021, and in 2023 they increased by 6.1% compared to the previous year. Budget revenues grew faster than GDP. This is highlighted by the size of the elasticity coefficient, which is above unity. Regarding the structure of budget revenues, approximately 59%-63% of the total are tax revenues. We also note that indirect taxes have the largest share (34%-35%).



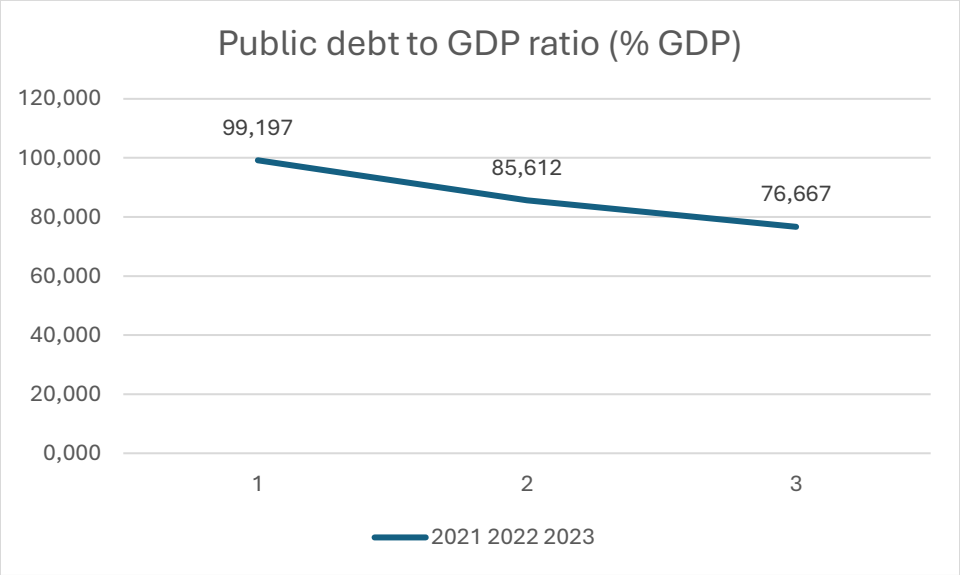
Source: Eurostat

A slight increase can also be observed in budget expenditures: budget expenditures in nominal terms in 2022 increased by approximately 4% compared to the previous year, and in 2023 they increased by 11% compared to 2022; the share of budget expenditures in GDP decreased by approximately 3% in 2022 compared to 2021, and in 2023 it increased by 1% compared to the previous year; and average expenditures per capita increased in 2022 by approximately 300 euros/capita, and in 2023 by approximately 1100 euros compared to the previous year. At the same time, budget expenditures in real terms decreased by 0.4% in 2022 compared to the previous year, but in 2023 they increased by 7% compared to 2022. During the analyzed period, it can be seen that GDP grew faster than budget expenditures. This is visible in the size of the elasticity coefficient which is sub-unit, or approximately equal to 1. Also, average expenditures per capita increased due to the increase in budget expenditures. In the structure of budget expenditures, 82%-85% are current expenditures, and 28%-30% are personnel expenses.



Source: Ameco

At the same time, in terms of the functional classification of budget expenditures, social protection expenditures have the highest share (28%-31%), followed by health and general public services. Through the fiscal pressure, it can be seen that the proportion of GDP collected from taxpayers is 34%-38%, social contributions have had the greatest contribution to increasing the level of taxation, respectively 13%-15% of GDP. The marginal rate of tax revenues, including CSS, increases from year to year by 0.5-0.6. It can be seen that at the beginning of the analysis period, the state recorded a budget deficit, but later it has a budget surplus. It is found that the analyzed state has a high level of indebtedness, over 60% of GDP, but a tendency to reduce it is observed.



Source: Ameco

4.The public finance of Belgium

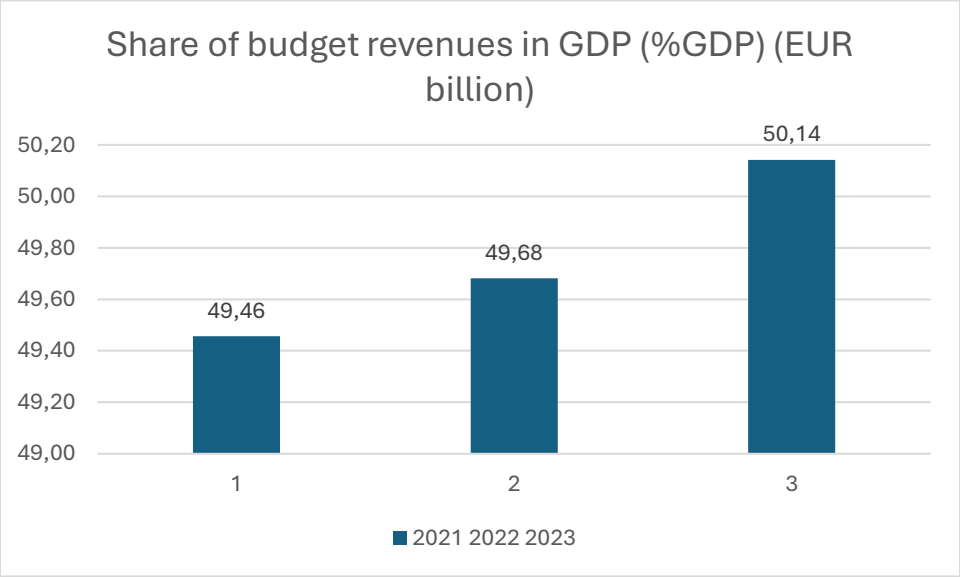
As part of the project, we conducted a brief analysis of public finances in Belgium, one of the member states of the European Union, during the period 2021-2023.The Kingdom of Belgium is a country located in Western Europe, a founding member of the European Union. The official monetary unit of Belgium was the Belgian franc, replaced by the EURO in 2002.

We collected recorded values at the level of budget revenues and expenditures, structured by economic or functional classifications, dynamics indicators and several other variables to understand how the Belgian state modifies its inputs or outputs at the level of resources allocated at the macroeconomic level, depending on the economic situation it is facing at that time.

The first major change that caught attention was the significant increase in the consumer price index in 2022 (123.26), compared to 2021 (111.71), registering an increase of 11.55%, which then remained at the same high level during 2023. This price inflation helps to understand the other changes that occurred in the public finance budget in Belgium.

Throughout the analyzed period, the country's budget resulted in a budget deficit, at a slightly lower level in 2022 compared to the first year, but which returned to the same value in 2023. The situation of the decrease in DB in real value in 2022 occurred due to the decrease in both budget revenues and budget expenditures.

The nominal value of receipts initially shows us that the Belgian state has received increasingly larger amounts, but the real value calculated with the HICP reveals the situation in which the budget actually received less money in 2022 than in 2021, with a decrease of 0.69%, and recorded an increase of only 4.11% in budget revenues, namely an increase of 9.05 billion euros, in 2023 compared to 2022. The elasticity coefficient of VB in relation to GDP was analyzed throughout the period at a level close to unitary elasticity, with very slight increases in 2023.



Source: Eurostat

The situation of budget expenditures shows changes in the same directions as VB, but relatively major. In nominal terms, budget expenditures had a gradual and upward growth rate, but in real terms we have the following data: in 2022, the ChB decreased by 4.04% compared to 2021, and then changed by 5.73% in 2023 compared to 2022. Budget expenditures proved to have a sub-unit elasticity in 2022, and then super-unitary in 2023, which reveals that the state decided to increase its expenditures without increasing its revenues in order to support the economy in 2023.

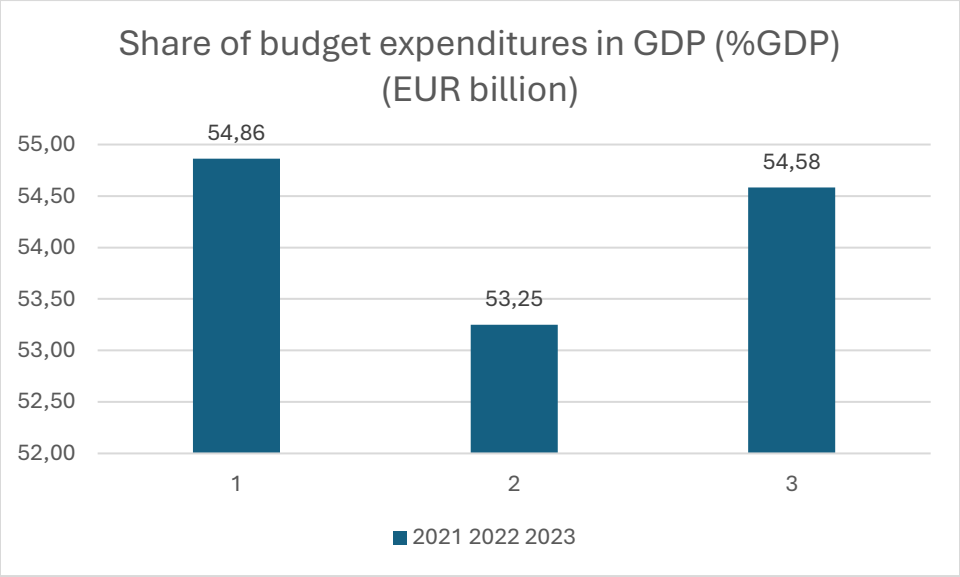
Regarding the share of VB and ChB in GDP, both level indicators remained at an approximately constant level, with very slight continuous increases at the VB level (~49% GDP -> ~50% GDP), and a slight decrease in 2022 (from 54.86% GDP to 53.25% GDP), then a return of ChB to 2023 (54.58%GDP).

Another situation that caught attention was the evolution of the average values of vb and chb per capita. The population of the Belgian state recorded negligible increases of 0.7% and 0.6% respectively in 2022 and 2023, its number being 11.59 million in 2021. During the period 2021-2023, the inhabitants of the Belgian state benefited from an average amount higher than the average amount with which they contributed to the composition of budgetary revenues. Basically, the Belgian state spent an average of 25,484.69 euros per capita, while collecting an average of only 23,394.60 euros, an annual difference of 2,090.09 euros that it partially covered through various methods.

The fiscal pressure (PF) at the macroeconomic level exerted by tax revenues recorded an approximately constant level throughout the analyzed period, but with a slight increase overall during the study. The PF of tax revenues (VF) has a higher share (~29% GDP), compared to social security contributions (SSC) (~15.09% GDP). An interesting thing about the composition of the PF exerted by budget revenues is the fact that the shares of direct taxes (ID), indirect taxes (II) and CSS are approximately the same, with II having the lowest share (~12.99% GDP). The PF of ID increased in 2022, compared to the weight of the other two indicators, which decreased, and then in 2023 the fiscal pressure of ID decreased, while the PF of II and CSS increased slightly.

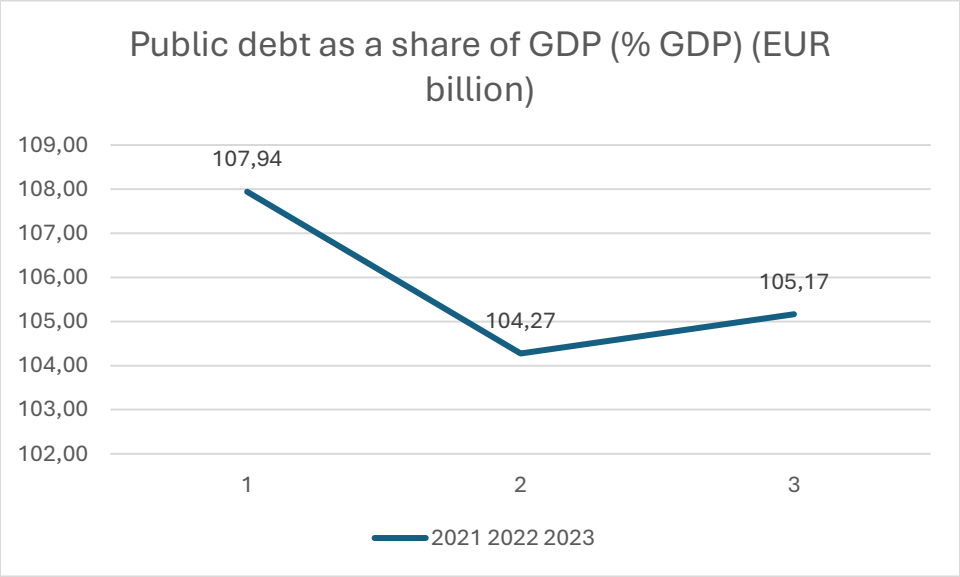
This denotes the fact that the state has not significantly changed its strategy for accumulating budget revenues.

According to the VB structure, the state drew its budget revenues equally from both direct taxes and indirect taxes and social security contributions. According to the ChB structure, according to the economic classification, source Ameco, the largest budget expenditures were recorded at the level of social transfers (on average ~28.86% ChB) and at the level of personnel expenses (on average ~22.90% ChB), and according to the functional classification, source Eurostat, the largest expenditures were sent to social protection (on average ~37.90% of ChB).



Source: Eurostat

Public debt increased enormously in nominal value, and in each year of the analysis, it had a value well above the effective GDP of the state. However, like VB and ChB, in real value, adjusted with HICP, we can see how it actually decreased in 2022, from 490.91 billion euros in 2023 to 468.85 billion euros. The share of GDP of the DP decreased by 3.67% in 2022 compared to 2021, and then immediately increased to approximately the same level recorded in 2021 in 2023, namely to 487.74 billion euros. With the significant increase or decrease in the ChB, this was predominantly reflected in the value of the DP.



Source:Eurostat

Another major change that caught attention was the dynamics of the budget balance. Relatively similar to the DP situation imposed by changes in budget inflows and outflows that had

cascading consequences on the dynamics of other indicators, the budget deficit registered a significant decrease in 2022 compared to 2021, by 7.68 billion euros, and then in 2023, compared to 2022, the budget deficit increased by 6.18 billion euros. eur, returning almost to the initial level of 2021.

These changes reflect the way in which the public finances of the Belgian state have managed a crisis situation, namely the inflation that Belgium faced in 2022, according to statistical data, which the government managed to reduce without endangering the well-being of the population. According to the calculated data, already from 2023 public finances begin to easily return to the levels initially recorded, while inflation is significantly reduced. Budget revenues have been kept at an approximately constant level in real prices, so that the fiscal pressure of the budget on the living standards of the inhabitants has not increased. The marginal tax rate attests to the fact that no extreme changes have been experienced relative to the growth of the country's GDP. The danger has not yet been overcome, so the state has decided to continue spending more than it receives from the country's inhabitants, in order to keep inflation under control. Therefore, public debt continued to increase in 2023, compared to 2022.

5.Conclusions

Comparing the public finances of Estonia, Belgium and Cyprus, we see three distinct economic models, each with its own advantages and challenges. Estonia stands out for its extremely prudent management of public finances, with very low public debt and a simplified tax system based on reinvested corporate income tax, which favours investment and sustainable economic growth. In contrast, Belgium has a developed economy but faces high public debt, driven by a large public sector and a progressive tax system designed to support robust social services. Cyprus, hit by the 2013 financial crisis, has adopted reforms to stabilise its finances while maintaining a competitive tax regime to attract foreign investment, particularly in the financial and real estate sectors.

While Estonia exemplifies a model of fiscal responsibility and advanced digitalisation of public administration, Belgium relies on a strong social protection system, but with risks related to long-term debt sustainability. Cyprus, while achieving a relatively rapid economic recovery, remains vulnerable to financial market fluctuations and challenges related to economic diversification. Thus, each country reflects a different balance between economic growth, public debt sustainability and taxation levels, offering varied perspectives on public finance management in Europe.

The comparative analysis of public finances in Belgium, Cyprus, and Estonia highlights distinct fiscal approaches shaped by their economic structures, policy priorities, and historical contexts. Belgium, as a highly developed economy with a complex federal system, faces challenges in

managing a high public debt-to-GDP ratio while maintaining robust social welfare and public infrastructure. Cyprus, emerging from a financial crisis in the past decade, demonstrates a focus on fiscal consolidation and economic diversification, with an emphasis on reducing debt levels and attracting foreign investment. Estonia, renowned for its fiscal discipline and innovative e-governance, boasts a low public debt ratio, reflecting its conservative borrowing policies and efficient tax administration.

Despite their differences, all three countries share common challenges such as adapting to global economic uncertainties, ensuring sustainable fiscal policies, and addressing the financial pressures of aging populations. Moving forward, their experiences underscore the importance of tailoring fiscal strategies to national contexts while maintaining a commitment to transparency, efficiency, and long-term stability.

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DIGITAL FINANCE

Essay

Iliyan Iliev, Student, UNWE

ДИГИТАЛНИ ФИНАНСИ

Есе

Илиян Илиев Студент, УНСС, специалност Финанси

В моето есе взех едно нестандартно решение задълбочаващо се в най-важните два аспекта на дигиталните финанси това са парите и дълга, за периода на обучение стигнах до извода, че това са двете най-определящи части на финансовата материя. Смятам тяхното бъдеще за много по-важно от това на разплащанията и счетоводството, подобен тип системи не се изменят кой знае, колко въпреки това съм вместил и нещо за тях в търсене на отговор за това как, ще изглеждат парите на бъдещето и какъв модел на обществено третиране ще предстои за тях, приятно четене.

Дълга и парите са свързани от зората на модерната човешка цивилизация, който има пари може да кредитира този, който ги няма, но са му необходими този абсолютен факт е известен, като сблъсък между заемодатели и заематели. Докато самите пари съществуват, за да решат проблема в бартерната икономика, като остойностяват труда и благата в дадена валута или средство за размяна, различните икономически субекти и школи третират техните възможност за решаване на социално-икономическите проблеми през отделните времеви периоди. Навлизайки в 21-ви век човечеството се сблъсква с възможностите и силата на дигиталните финансови инструменти, както и с идеята за ново дигитално администриране осъществяващо по-бързо, ефикасно и ефективно решение на проблемите пред световната търговия, производство, пазар на труда и всички останали части от икономическия микс. По време на световната финансова криза от 2008 година се появява един изцяло нов дигитален децентрализиран финансов продукт наречен криптовалута, този нов вид валута се явява алтернатива на конвенционалната парична система наложена от обществото посредством правителството и централните банки, като дори вече в някой срани дигиталните пари са приети за официална валута. През различните времеви периоди хората сме тълкували много неща, като пари започвайки от хартия, скъпоценни метели, вулканични камъни и други предмети, които поради една или друга причина сме смятали и смятаме за нещо ценно и уникално.

Динамиката на дълга и валутите се е променяла многократно през годините, но сега на прага на технологичните промени породени от криптовалутите и блокчейна светът на финансовите пазари се променя. От около 15 години наблюдаваме бум на дигиталните валути породен от засиленият интерес, който включва всякакви макро и микро икономически субекти целящи защита на собственото си благосъстояние. От появата на

първата световно известна криптовалута, а именно биткойн се появиха безброй проекти на знайни и незнайни емитенти наречени миньори, който чрез комбинацията от мощен софтуер и хардуер, те превръщат енергията в пари. Логично в моето съзнание започна да изплува въпроса ако хората възприемат нещо, което не могат да пипнат или видят, освен на екрана на компютрите си, то какво ще е бъдещето на една нова икономика базирана на дигиталните пари, но може би по-важния въпрос е как ще изглежда дълга в тази нова икономика. От там започнаха да се появяват нови и нови въпроси с различно социално, държавно и икономическо значение. Дрезгаво започнах да се вълнувам от това как биха се стекли нещата в може би най-важните два пазара дълговия и паричния. Дали картели, престъпни организации и монополи нямаше да проявят по един или друг начин интерес към валута емитирана от самите тях. Дали правителствата по света нямаше да могат с един клик на бутон да създават пари елиминирайки сеньоража и по какъв начин щяха да се борят с евентуална глобална хиперинфлация породена от желанието им да се конкурират с други частни емитенти като банки, фирми и физически лица. От друга страна виждах и много сериозен потенциал в транснационалните компании, банки и фондове да създадат своя валута с която да принудят служителите си провъзгласят, като нови пари в разрез с желанието на правителството или други подобни планиращи същото нещо корпорации. Как хората ще се справят с един дълг, чиито последствия от не изплащането може да доведе обществото към пълна капиталова дестабилизация. Ще отпадне ли нуждата от върховен кредитор като ФЕД и ЕЦБ и дали всяка една банка просто няма да може да извършва същата дейност безпрепятствено и за сметка на големите играчи в пазара на дълг. Каква ще е гаранцията за лихвения процент и по какъв начин, ще протича неговото определяне. Парите, дали ще имат срок на годност с който да се управлява икономическата активност при желание на централизираната или децентрализираната власт.

Търсенето на истината за бъдещето на дигиталните финанси реших първо да погледна в историческите примери затова как са протичали подобен тип трансформации от обществено икономически характер. Връщайки си 5 хиляди години назад стигам до извода, че хората с право са направили трансформацията от бартерна икономика към парично стоков модел. Тази нужда, която те имат от средство за измерване на труда и богатство явно е била най-остра в древна Месопотамия. Преминавайки през различните разбирания за дълга на древните гърци и най-вече Аристотел, който пръв се противопоставя на кредитирането, като система нарушаваща монетарния баланс чрез извода от 1000 единици трудно, ще получим при олихвяване 1005 той смята, че тази система е неравномерна и ще бъде сериозен проблем за бъдещите поколения. Все пак успях да намеря и точно съпоставими примери със сегашната световна ситуация, единият от тях е от далечния 17 век когато в Нидерландия от Османската Империя е пренесена луковицата на лалето. В един момент всички сметнали, че лалетата са много по-ценни от какъвто и да било благороден метал играещ ролята на пари. Тази абсолютно нелогична лудост на холандските граждани и техните финансови борси продължава около десетина години преди тоталния си крах, който довежда до обезценка на този вид активи и прекратяване на десетки контракти по форуърдни сделки със спекулативен характер,

застрашил почти цялото благосъстояние на Нидерландия. Друг исторически момент, който съм решил да съпоставя със сегашната ситуация е периодът между 1830 година до края 1875 година в САЩ. Този период бих нарекъл дори по сходен със сегашното положение на света от манията по лалетата. През 1812 година конгресът позволява на банките да създават краткосрочни облигационни бонове, които да бъдат раздавани на приносители с които те, ще финансират войната от между САЩ и Великобритания. Впоследствие Америка претърпява няколко десетилетия осеяни с промени и дестабилизация. Двете икономически кризи останали в историята, като паниката от 1837г. И 1857г. принуждават американското правителство да позволи в обръщение да бъдат използвани облигационни бонове като частични пари, това е новост за американското общество, но и нововъведение, което е останало и до наши дни. За да се финансират различните военни начинания на Америка, като гражданската и мексикано-американската война правителството започва все по-интензивно да залага на такъв тип дългова валута представена не като благороден метал, а като най обикновена хартия, а през гражданската война тя е били и без покритие от благороден метал. След края на гражданската война обаче тези пари се запазват в обществото и тук идва в момента, който всяка една отделна банка е създала свой собствен облик на книжния долар. Подобен тип системи на книжните пари са били наблюдавани и в други общества, но в Америка те се градят на дълг, който се номинира в златна или сребърна стойност. Естествено много бързо всички мошеници и фалшификатори на пари разбират, че е много по-лесно да се създаде банка с която те могат лесно да си напечатат колкото пари поискат, отколкото да трябва да фалшифицират вече съществуващи валутни единици на самостоятелните банки емитенти. Тази ерата на свободното банкиране от 1837 до 1863 година е породена от факта, че елиминираната централната банка, която трябва да упражнява контрол върху истинността на парите просто е премахната, като довежда друг проблем, който се забелязва в онзи период а именно съотношението на един долар от банка Х спрямо цената на друг долар от банка У ,които обикновено в онзи период не са били едно към едно поради факта, че банка Х има 1 милион напечатани долари а банка У 10 милиона или се създава отделна и неравномерна парична маса като проблема е разрешен с закона за долара от президент Линкълн. Сега сигурно ще възникне въпросът, защо разгледах точно тези два периода от историята на икономиката и стопанството, ами защото смятам че периодът в който се намираме в момента е доста сходен с точно упоменатите исторически събития от 17-ти и 19-ти век.

Оттук смятам да започна да давам отговор на въпросите, който зададох дали икономическите и финансовите организации, ще се възползват от криптовалутите и крипто дългът, но имайте предвид смятам, че самото кредитиране ще си остане почти не променено, важно е как ще се емитира то. Сигурно желанието на големите транснационални банки, които ще се опитат да сложат ръка на свой собствен тип валути с които да успеят да се наложат над по малките си конкуренти, може да доведе до създаване на огромни над държавни интернационални картели и монополи, което разбира се е в редът на икономическата цикличност, както и тяхното неизбежно самоунищожение породено от загуба на пазарно доверие и нужда от обновление, едни

фирми си отиват идват други, но какво правим с парите. Те ще се стремят всячески към това да завладеят по-голям и по-голям пазарен дял използвайки собствената си валута, но при евентуален фалит това ще е неблагоприятно за всички. Да си представим че банка като Сусиете Дженерал Експресбанк има своя криптовалута СД и емитира дълг ако банката фалира то загубата, ще е за всички по веригата клиенти, хора държащи пари в СД, кредитори и други контрагенти, но това е само при условие на слаба централизация и органична държавност на където са се насочили част от страните в развития свят.

От друга страна пък правителствата няма да останат по-назад от частните структури, които са се ангажирали с това да овладеят пазара на дълг и валута в дигиталния свят, като дори смятам, че те биха били още по ангажирани в това да създадат дигитална валута с която да могат да упражняват контрол на всеки субект в собствените си държави. Варианта с едно кликване на бутон да успееш да контролираш благосъстоянието на даден индивид от обществото, който е удобен или неудобен на властта е изключително изкушаващо, за бюрократите които ще се опитат да прокарат подобен тип закони, за да може система на CBDC да се разгърне и да представи дигитални варианти на валути като долар, евро, рубла и йоан. Ако приемем, че инфлацията се поражда от дълг то тук вече нещата стоят малко по-различно инфлационните настроения могат да се пораждат по-скоро от възможността на изчислителния софтуер да създава валута на база на копаене, както е в досегашната система. Следва въпросът как точно, ще бъде структурирана правителствената валута, дали тя ще бъде емитирана от някаква огромна по рода си крипто миньорска институция или ще е продукт на Централизирана национална банка, която да създава крипто парите и да раздава новия виртуален дълг. Разглеждайки теория, която може да елиминира на практика създаването на държавен дълг от емитиране на нови пари, а именно срочните пари ако правителствата могат да си позволят да направят парите със срок на годност, тоест амортизираща се единица те могат при всеки един пазарен провал и асиметрия на пазара да се намесят така, че със самото потребление принуждавайки хората да си извадят спестяванията и да коригират отклоненията и неблагоприятния резултат, подобно теоретично решение може и да звучи много добре на хартия, но аз съм склонен да вярвам, че поради човешката природа много трудно или поне не докато съм жив, ще видя подобен тип решения на икономическите проблеми с разминаването между търсене и предлагане от всякакво естество парично, стоково или дългово.

Дали, ще отпадне необходимостта от централен кредитор е също доста интересен въпрос, който мога да поставя към графата на това дали правителствата и тяхната нужда да гарантират парите, ще отпадне и ще бъде ли изместена от корпорациите. Подобен тип общество ако такъв сценарий бъде осъществен в бъдеще, ще е доста интересно за наблюдение моята лична представа е че подобно нещо може да се случи, ако множество корпорации или някакви многосекторни обединения създадат свои собствени криптовалути с, които да се разплащат към доставчици, кредитори и работници. Подобна теория може да създаде по-скоро един огромен хаос в обществото в първоначалния момент до достигане на някакво напасване, между макроикономическите и микроикономическите субекти след, което смятам, че на теория е възможно подобно

разбиване на икономическите стандарти, което би могло да се случи само в глобализирана икономика не зависеща от мита и ограничения. Генерален кредитор като ФЕД и ЕЦБ няма да бъдат необходими тъй като валутата, която ще използват предполагаемите лица и корпорации, ще бъде създавана на принципа на изкопаване или още казано криптиране и на някакви качества на самата валута, обвързани по скоро с продуктите на фирмата и нейният личен престиж в това мултикапиталово общество. Върховен кредитор няма да бъде необходим в подобен сценарий, защото ще важат принципите на класическата школа и теорията на Рикардо, която твърди че вътрешното кредитиране само преразпределя благата и не поражда инфлация в случай на ограничено създаване на нови пари. Ако обаче приемем, че всяка една банка или фирма, ще може да създава свои собствени пари то тогава трябва да създадем огромен брой цени на всяка една валута и различни номинации на стоките в различните валути, предполагам че банките биха имали стабилен интерес в това, защото те ще контролират разплащанията и сетълментите между различните субекти в стопанството. Подобен пример за такава валута обвързана за човек лице на корпорация е Илън Мъск и неговата Dogecoin както и измамата Onecoin на Ружа Игнатова която трябва да дава множество услуги и продукти на клиентите, но всъщност се оказва престъпна схема.

Все пак може би неговият въпрос, ще остане в това кой и как би могъл да определи лихвите и условията на дълг. Разглеждайки позитивния икономикс базиращ се на икономическата обстановка в точно настоящия момент то смятам, че ако сега да кажем банка се опита да емитира дълг номиниран в ETH на криптовалута, то тя ще трябва да го вземе от миньор, депозитор или сама да го изкопае. Въпросът, който възниква тук е при каква лихва, ще се опита да даде банката съответния кредит освен на пазарнодоходния принцип на инвестиране и кредитиране. Разглеждайки двата сценария на анархокапитализъм и този на тотален институционализъм съм длъжен да разгледам двата сценария. В анархокапитализма, ще гледаме фирми и обединения със своите валути конкуриращи се как да предложат по-добра лихва за купувачите на дълг, търсещи доходност и продавачите на дълг търсещи пари в постоянен инвестиционен конфликт, но по интересното е как стоката, ще се променя, ако знаем принципа, че при силна валута можем да купим повече вносни стоки то при транснационални конгломерати дали, ще бъде приложим и дали продуктите и услугите, ще се променят така както и валутата с цел лансиране на потреблението . При тоталния институционализъм, който ще е олицетворение на държавата контролираща обществото, чрез подобен криптодълг и криптовалута то смятам, че единственият и логичен отговор е да заключа, че централната банка ще контролира лихвения процент както е било досега. Банковите и правителствените интереси, ще доминират отново в подобен тип общество, като хората ще трябва да се съобразяват с това парите и техните дългове да са уязвими на, някой правителствен чиновник да ги ликвидира с едно натискане на бутон.

Разпадането на институционалната рамка и това кои и как, ще определя лихвения процент е доста сложен въпрос. Докато знаем, че зад правителството ще стоят експерти, които да преценят кое решение, ще е полезно или вредно за дадения времеви икономически период то ситуацията стои доста по-различна за частния сектор мотивиран

от печалбите. Логично е да се предположи, че всяка една отделна валута ще има своята собствено особеност, от технологичното изкопаване на дадената валута дали за добива, че ще бъдат ангажирани определен брой субекти каква, ще бъде нейната цена и мотивацията на дадените миньори да копаят точна тази валута, какъв точно ще бъде кодът, който ще е програмиран. Ще остане по-скоро в кредитните институции било то инвестиционни фондове банки и прочие, които ще се намират в постоянна борба за това кой да предложи на пазарен принцип по-добър и по-добър лихвен процент. Връщайки се към примера от Америка ще говоря и за това, че ако имаме множество и най-различни валути с които банките, ще оперират и ще емитират то ние като макроикономически субекти, ще трябва да решим коя валута ще ни предостави най-хубавия условия, логично е ако работим в предприятие или търговско обединение предоставящо широка гама услуги и стоки да заложим на тяхната валута и дълг към самите конгломерати работодатели. Те вероятно, ще се опитат към своите работници да предложат нещо, като преференциални условия по дълга или ако са по малки предприятия, ще се включат в паричната матрица на концерна майка или към търговско обединение с акции. Въпросът за цената на деноминацията също остава, ако се емитира дълг от една криптовалута как ,ще се търгува вярвам, че принципа ще остане не променен просто валутните разлики ще се променят. Ако приемем, че много от нещата ще са цифрови то на теория може да се достигне до една безкрайно увеличаваща се спирала от дълг, но тук изплува концепция на нещо което трябва да гарантира и криптодълга и валутите, това смятам ще бъде биткойн, макар и по дефиниция валута той носи характеристика и на природно благо със способността си да се изчерпва след определено време. Това кара хората да го смятат за по уникален от действителност и все пак трябва да има нещо подобно на безрисково норма на възвращаемост и на златото като активи, който няма как да загубят стойност заради общите човешки вярвания, че едно нещо е по скъпо ако е уникално, сигурно и исторически издържано. Трансформацията на международните разплащания също би трябвало да се промени, сетълментите по дълг, инкасото и паричните преводи ще претърпи сериозни промени заради възможността те да се извършват мигновено, както е на много места по света и до някаква степен това вече е факт, но дали ще има възможност да се избяга от тази система надали, както и от плащането на данъци, който ще са със сигурност по лесно събираеми от колкото в миналото, като това ще реши проблема с укриването на данъците до някаква степен, но дали ще се реши проблема с избягването им.

В заключение смятам, че бъдещето на паричната, дългова и като цяло финансовата система, ще бъде пряко обвързано с дигитализацията и глобалните интернационални връзки. Подобно на периодите, които представих смятам че успоредното движение на индустриалното и научно-техническо развитие ще наложат нуждата от изцяло нови системи и учреждения, които да гарантират сигурността на икономиката в световен мащаб. Такъв вид промени ще бъдат приети от обществото по различен начин, но истината е интересът на капитала, ще наложи новия обрив на дигиталната финансова система. Човек може да се адаптира само към ситуацията и да се опита да осигури най-доброто за себе си и за близките си, но в търсене на отговорите за бъдещето няма как да

не изпитва несигурност. Дигиталните Финанси просто ще сменят своя облик, но не и цялостната си същина, а именно като инструменти описващи благосъстоянието или отговорността на даден индивид или група от индивиди просто методиките, институциите и част от функциите, който са изпълнява ли ще се промени. Каквото и да подготвя бъдещето смятам, че всички трябва да се замислят върху това в какви активи, ще е най-добре да диверсифицираме благата си, за променливия свят на дигиталните пари всичко тепърва ще си идва на мястото. Възможни нови проекти крият своите рискове за малкия човек, но големи възможности за увеличение богатството. Дали наистина някоя от моите прогнози ,ще се сбъдне не мога да бъда сигурен, но смятам, че дигитализацията ще преобрази света, като по всяка вероятност ще го направят по глобален и свързан от преди за сметка на статуквото. Тази неизбежна промяна определено, ще размести идеологическите слоеве в света. Дали тези Виртуални финанси няма да могат да позволят развитието на една по-добра система на социално устройство в обществото, което да доведе до нов свят заложил на устойчивост и чистота. На тези и други въпроси само времето, ще даде отговор, но дотогава да се опитаме да предпазим себе си и капитала си гарантирайки по благоприятно бъдеще за нас и нашите наследници в динамиката на дигиталните финанси.

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Дигитални финанси

Есе

Йоанна Пенева[1]

От момента, в който отворим очи, за да се събудим, до момента, в който положим глава на възглавницата и заспим, всичко около нас е повлияно от дигитализацията. Тя е в ръцете ни, на китките ни, в чантите ни, в домовете ни. Това променя целия ни живот и ще продължава да го прави и в бъдеще, както в личен, така и в професионален план. Финансовата дигитализация е един от най- големите скокове на човечеството, защото тя има способността да промени хода на живота и бизнеса към по- добро. Нови технологии и иновации се появяват с всяка следваща година и за нас е предимство да бъдем добре образовани и на „ти“ с всяка една промяна. Целта на това есе е да запознае читателя с видовете дигитални финанси и техните предимства за бизнеса и потребителя.

Дигиталните финанси са ключови за подобряването на достъпа до финансови услуги и повишаването на ефективността на финансовите системи. Благодарение на тях се подобрява и рентабилността на финансовите услуги, като ги прави по- достъпни за обществото. Това е особено полезно за малките населени места, където достъпът до физически финансови институции е органичен. От корпоративна и бизнес гледна точка дигиталните финанси спомагат за спестяване на разходи, по- висока ефективност и подобрено изживяване на клиентите - три насоки, които са едни от основополагащите стълбове на един успешен бизнес, а от потребителска страна осигуряват удобство, гъвкавост и сигурност – едни от основните критерии на клиента при избор на доставчик на финансови услуги. И това е не само разбираемо, но и очаквано – все пак клиентите са основният мотиватор за развитието на финансовия сектор. Те търсят скорост, достъпност и способност да извършват лесни финансови транзакции по всяко време и на всяко място, потребности, които няма как да останат незадоволени при така бързия темп на живот. Тук е ролята на дигиталните финанси, които дават отговор на всяко едно от тези искания и при това успешно. Те обхващат широк спектър от технологично развити финансови дейности в това число онлайн банкиране, мобилни плащания, ПОС терминали и криптовалути и др.

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Дигиталното банкиране не е нова концепция, но стана особено популярно сред хората по време на КОВИД-19, когато посещението на местния банков клон не беше възможно. Поради това много от тях започнаха да го „преоткриват“ и да се чувстват удобно да го ползват, а след време дори и да го предпочитат. Според данни от Евростат 66% от интернет потребителите са използвали услугите на онлайн банкиране.[2] Тази дигитализация на банкови услуги им позволява да посрещат лесно и ефективно финансовите си нужди посредством онлайн и мобилни приложения. Днес всеки може да извършва плащания, да проверява наличности по сметки, да превежда пари, да тегли кредити и да открива и закрива сметки само с няколко клика от удобството на дома или друго място. Приложенията за мобилно банкиране са изключително популярни сред всички Милениали и Gen Z- та. Според данни на Американската Банкерска Асоциация 57% от Gen Z и 60% от Милениалите използват приложения за мобилно банкиране.[3] Това отвори врата и за създаването на онлайн банки, които нямат физически клонове и централи, а вместо това осигуряват средствата на потребителите чрез банки- партньори особено когато става въпрос за транзакции и обмен на валута. Те често работят с по-ниски такси в сравнение с традиционните банки. Използват съвременни технологии и извършват същите услуги като например: откриване и закриване на спестовни сметки, кредитни и дебитни карти, някои дори предлагат и опции за кредити, макар че не всички предоставят пълния набор от кредитни услуги. Такива банки „претенденти“ са Revolut, Monzo и N26.

Дигиталното банкиране често върви ръка за ръка с мобилни портфейли. Те позволяват на потребителите да съхраняват данни за плащане и да плащат с телефоните си, вместо да носят физическите си портфейли. Мобилните портфейли често се интегрират с банкови приложения, някои също предлагат функции за проследяване на разходите и анализ на финансовото поведение на потребителите. Едни от най-популярните мобилни портфейли включват Apple Pay, PayPal и Alipay. При такова увеличено потребление на онлайн банкиране и портфейли кешовите плащания намаляват, което от своя страна има потенциал да доведе до по- голяма прозрачност в икономиката, тъй като електронните транзакции са по- лесни за проследяване. На това се казва удобство, съчетано със сигурност.

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[2]Евростат, 2023, статия, https://ec.europa.eu/eurostat/web/interactive-publications/digitalisation-2023#people-online

[3] АБА, 2023, статия, https://www.aba.com/about-us/press-room/press-releases/consumer-survey-banking-methods-2023

Онлайн банкирането и мобилните портфейли далеч не са единствените, които променят пазара на финансовите услуги. Финтех компаниите също са включени в това число. Те използват технологии, за да предлагат иновации в сферата на финансовите услуги. Някои от най- известните категории финтех компании включват: платформите за мобилни плащания, криптовалутни борси, агрегатори на лични финанси (помощници за управление на финансите на едно място), платформи за кредитиране, които свързват заематели с инвеститори, алтернативни на обикновените банки и робо- съветници (платформи за автоматизирано инвестиционно управление). Според данни от Статиста Съединените щати и Китай са дом на осем от десетте най-големи финтех компании в света.[4] Въпреки че тези две държави доминират, двата най-ценени финтех компании в края на 2023 г. бяха Stripe и Revolut, чиито седалища се намират в Европа.[5] Stripe е оценен на 50 милиарда щатски долара, което е значително повече от оценката на Revolut, която е 33 милиарда щатски долара. Revolut отчита 35 милиона клиенти в края на 2023 г.[6] Това определено дава „хляб за размисъл“ в посока на мащабността на финтех сектора. Той се развива изключително динамично, демонстрирайки значителен потенциал за влияние върху глобалната финансова система. Доминирането на САЩ и Китай в тази сфера подчертава стратегическото значение на технологичния напредък и финансовите иновации, но успехите на европейски компании доказват, че пазарът е глобално конкурентен и се развива отвъд границите на най- големите икономики. Финтех секторът е двигател на иновации, защото е бърз и удобен и предлага възможност за компаниите и обикновения потребител да взимат информирани решения. Тези услуги направиха финансовото планиране по-достъпно за средния потребител, който обикновено няма достатъчно средства. С това виждаме как дигиталните финанси могат да са достъпни и да работят за всеки без значение от статуса, образованието и професията. Нещото, което правят дигиталните финанси това, което са, е „мостът“, който създават между ново и старо, помагайки на потребителя да направи този преход леко, спокойно и удобно.

Друг много популярен аспект в последно време, който повдига много въпроси и интерес, и влиза под тяхната шапка, са криптовалутите, особено биткойн. Това са цифрови валути, които си служат с блокчейн технология за осигуряване на онлайн транзакции. Вместо да ги държим в портфейлите си, ги съхраняваме само онлайн. Самата технология е като огромен регистър, където всички транзакции се записват и проверяват

[4] Статиста, 2024, статия, https://www.statista.com/topics/2404/fintech/#topicOverview
[5] Статиста, 2024, статия, https://www.statista.com/topics/2404/fintech/#topicOverview
[6] Статиста, 2024, статия, https://www.statista.com/topics/2404/fintech/#topicOverview

от хора по целия свят. Могат да се купуват, продават или използват за покупки онлайн. Други обаче предпочитат да инвестират в тях, но трябва да се подхожда с внимание, защото цените се променят много бързо. Тоест, човек може да изгуби много пари, ако стойността падне. Средствата се прехвърлят лесно, а и осигуряват защита от инфлация, за разлика от добре познатите ни парични средства и валути. Криптовалутите не са регулирани от правителства, което значи, че хората имат повече контрол над тях, но и създава риск от злоупотреби. Това е поради факта, че те са трудно проследими, транзакциите са анонимни и адресите на портфейлите не са свързани с реални имена, освен ако не се предоставят от самия собственик. Този факт води до различни търговии в т.нар. тъмна мрежа. Въпреки че изглеждат много примамливи, не мисля, че рискът си струва, заради ниската регулация, променливост, сложна система, както и ограничено приемане като разплащателно средство.

Както монетата има две страни, така и дигиталните финанси идват със своите предимства и недостатъци, един от които е именно несигурността вследствие на хакерски атаки. Но в днешно време коя система ли е застрахована? Все пак мисля, че предимствата надвишават недостатъците. Ефективността е едно от тях. Разчитането на дигиталните финанси помага на потребителя да се съсредоточи върху по- приоритетни задачи и да увеличи производителността си. Още едно предимство са ниските такси в сравнение с традиционните банки, както и намаляване лихвите по кредитите. За бизнесите, например, дигиталните финанси позволяват анализирането на поведението на клиентите чрез транзакциите, видими в системата. В допълнение към това интеграцията с други цифрови услуги и платформи за електронна търговия помага за опростяване на процесите и лесното систематизиране и организация. Не бива да забравяме и екологичното предимство. Дигитализацията намалява използването на хартиени документи, което е проява на грижа към околната среда. Дигиталните финанси помагат и за напредването на държавната икономика, включително събирането на държавни приходи. Тяхното използване е стратегически ход, който би могъл значително да подкрепи икономическото развитие и социалната устойчивост. Чрез въвеждане на модерни дигитални системи, правителствата могат по-ефективно да идентифицират и обхващат данъчната основа. Това не само увеличава прозрачността и отчетността в процеса на събиране на данъци, но и създава предпоставки за повече доброволно данъчно спазване от страна на гражданите и бизнеса. Според данни от Международния Валутен Фонд електронните системи за подаване на документи, фактуриране и фискални устройства могат

значително да увеличат данъчните приходи. Например, използването на електронно фактуриране и фискални устройства би могло да доведе до ръст в събраните приходи, възлизащ до 0,7% от брутния вътрешен продукт.[7] Според мен това би било значително предимство за икономиката и би осигурило значителни средства, които биха могли да се инвестират в обществени проекти и подобряване на социалните услуги.

В заключение можем да заявим, че дигиталните финанси безспорно променят съвременния свят, предлагайки удобство, бързина и достъпност. Въпреки че дигитализацията във финансовия сектор донесе значителни предимства както за потребителите, така и за бизнеса, тя продължава да поставя въпроси относно сигурността и регулацията. Вероятно тепърва ще видим как глобалните и местните регулатори ще отговорят на нарастващата популярност на финтех компаниите и криптовалутите, за да създадат среда, в която иновациите и стабилността да съществуват заедно.

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ДИГИТАЛНИ ФИНАНСИ

***ECE*[1]**

"Technological innovations will be the heart and blood of the banking industry for many years to come." – John Stumpf, former CEO of Wells Fargo

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От десетилетия насам финансовата индустрия преживява непрекъсната еволюция в предоставянето на услуги поради дигитализацията и цифровизацията. Тази еволюция се характеризира с разширена свързаност и повишена скорост на обработка на информацията, както в ролята на потребител/клиент, така и в процесите на корпоративно ниво.

Дигиталното финансиране е познат термин, но какво точно представлява той? Какви промени носи със себе си цифровизацията? Какво са *дигитални финанси*? С превръщането на парите в цифрови се появяват нови възможности и проблеми - от бързината на транзакциите до рисковете от внезапни и мащабни смущения в банковото дело и икономиката. Как обществото може да балансира между иновациите и сигурността?

Това е термин, използван за описание на въздействието на новите технологии върху сектора на финансовите услуги. Дигиталните, наричани още цифрови финанси, се определят като финансови услуги, предоставяни чрез мобилни телефони, персонални компютри, интернет, мобилно банкиране, електронни портфейли, мобилни портфейли и кредитни и дебитни карти[2]. Въпреки, че няма стандартно определение за цифрови финанси, съществува известен консенсус, че дигиталните финанси обхващат всички продукти, услуги, технологии и/или инфраструктура, които позволяват на физически лица и дружества да имат достъп до плащания, спестявания и кредитни улеснения чрез интернет (онлайн), без да е необходимо да посещават банков клон или без да работят директно с доставчика на финансови услуги. За разбирането на това понятие, следва да се посочи и неговият обхват - широк спектър от финансови дейности, свързани с технологиите, включително онлайн банкиране, мобилни плащания, ПОС терминали и криптовалути. Използването на цифрови технологии за достъп до финансови услуги (известно като

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[1] ***Николай Йонков Йовчев,*** *студент в магистърска програма при УНСС. Есето изразява авторовото разбиране за икономическите условия, икономическата терминология, посредством изразяване на собствено мнение и направата на адекватни и аргументирани прогнози на база на анализ и изследователско изследване по темата. В есето се прави преглед на текущото състояние на изследванията в областта на дигиталните финанси, които се занимават с тези нови и иновативни бизнес функции.*

[2] *(Manyika et al., 2016; Durai & Stella, 2019).*

Fintech) е ежедневие за милиони и ще се превърне в нарастваща тенденция в начина, по който харчим, изпращаме и спестяваме пари. Именно затова водещата цел на цифровите финанси е да се увеличат обхватът, скоростта и рентабилността на финансовите услуги, като те станат по-достъпни за широката общественост.

Какви са перспективите пред цифровите, дигитални финанси? Как те влияят на обществото? Какви са предимствата и недостатъците на дигиталното финансово приобщаване? Дигитализацията превръща света в по-добро място, нали? Как интелигентните технологии влияят на финансовата индустрия?

В сектора на финансовите услуги се наблюдава бързо ускоряване на тенденцията към дигитализация и цифровизация. В този свят на цифрова трансформация традиционните финансови услуги се интегрират с нови и нововъзникващи технологии. Дигиталните активи ще преобразят финансовата индустрия през следващите години, като променят начина, по който участниците на пазара инвестират, набират финансиране и прехвърлят средства. Терминът *„дигитални финанси“* описва миграцията на финансовия пазар или неговите функции към цифровия свят. Секторът на финансовите услуги определено не е прохождащ в областта на цифровата трансоформация, но инвестициите в дигитални финанси и степента, в която се възприема цифровизацията, определено се ускориха през последните години. Напоследък се наблюдава изместване на фокуса на цифровизацията от подобряване на изпълнението на традиционни задачи към въвеждане на принципно нови бизнес възможности и модели за дружествата за финансови услуги. Дигиталните финанси се отнасят до процеса на трансформиране на традиционните банкови и финансови услуги чрез използването на нови технологии. По-конкретно, използването на цифрови продукти и инструменти за предоставяне на финансови услуги.

Цифровите финанси са в основата на цифровия преход и ако се осъществяват успешно, могат да донесат големи обществени ползи, и да се превърнат в двигател и ключ към успешен преход към цифрова икономика. Секторът на финансовите услуги е повлиян от иновативни технологии, които могат да бъдат от полза както за потребителите, така и за дружествата, като предоставят по-голям достъп до финансови услуги, предлагат по-широк избор и повишават ефективността на операциите. Дигиталното финансиране играе важна роля за постигането на целите за финансово приобщаване, които имат положително

въздействие върху икономическия растеж и благосъстоянието на хората. Един от основните елементи на дигиталните и цифрови финанси са дигиталните плащания, които играят все по-голяма роля с навлизането на електронната търговия и финансовите технологии (fintech).

Но кои са примерите за дигитална трансформация във финансите? Нарастване използването на онлайн/мобилно банкиране, финтех компании и предоставяните от тях решения, блокчейн технология, появата на банките претенденти (challenger banks).

Основната съставка, необходима за цифровото финансиране, е **финансовата грамотност**, т.е. знанията за достъп и използване на услугите внимателно. Цифровите финансови услуги са основно онези финансови решения като банкиране, спестяване, застраховане, финансово образование и достъп до достъпни кредити, които са насочени към крайните физически или юридически лица. Интернет банкирането е най-разпространената и най-старата форма на цифрово финансиране.

Изкуственият интелект се счита за бъдещето на дигиталните финанси, тъй като технологията с изкуствен интелект ще помогне на финансовите институции да предоставят по-добри услуги, а от друга страна, ще помогне на потребителите да следят своите трансакции, посредством облекчен достъп до средствата си. От друга страна роботиката в бъдеще ще замени традиционните банкови служители и ще ускори цялата работа, изискваща човешки усилия, което ще спести много както в парично, така и в концептуално отношение. Анализът на големи масиви от данни е бъдещето във всяка област и финансите определено ще бъдат във фокуса на промените.

Цифровите технологии предоставят както възможности, така и рискове за постигането на широко споделен просперитет. Постигането на тази цел няма да е лесно. То ще изисква съвместна работа между публичния и частния сектор. Въпреки, че дигиталното финансиране има потенциал да разшири приобщаващия достъп до финансови услуги съществуват рискове, които се развиват по своя характер и нарастват по брой и мащаб. През последните няколко години се появиха и нови рискове, като например измами с мобилни приложения, измами с биометрични идентификатори, измами, свързани с криптовалути, и измами с оторизирани push плащания. Някои от тези рискове са пряко създадени от недобросъвестни доставчици, които дори да са малко на брой, могат да причинят значителни вреди на клиентите и на пазара. Дигитализацията на финансовите услуги

действително бележи ключов момент в развитието на банковия сектор. Цифровата трансформация не само промени видовете предлагани услуги, но и предефинира начина, по който тези услуги се предоставят и потребяват. Тя също така намалява разходите за предоставяне на трансгранични финансови услуги, като намалява необходимостта от физическо присъствие на чужди пазари, което всъщност може да е от полза за интеграцията в сектора. Дигиталните финанси предлагат ползи и възможности, които могат да окажат положително въздействие върху финансовата и икономическата интеграция в трансграничен план, създавайки връзки между икономиките както на регионално, така и на глобално равнище последствоm засилване на конкуренцията и предлагането на иновативни продукти и услуги. Предприятията в по-малките страни могат да навлязат на съседните и международните пазари и да получат финансиране за своите иновативни идеи.

Традиционните методи за банкиране - чрез клон, телефон или банкомат - вече не са толкова привлекателни. Не е изненадващ експоненциалният ръст, че през последните няколко години много банкови клиенти се възползват от възможностите за дигитално банкиране. Клиентите могат да имат достъп до сметките си по всяко време и от всяко място и да извършват широк спектър от операции, като например проверка на салдата по сметките, прехвърляне на средства, плащане на сметки и кандидатстване за кредити.

Кои са положителните и отрицателни страни на дигиталните финанси и трансформирането на сектора? Като положителни може да посочим: по-голяма ефективност, повишена сигурност (подобряваща се), подобрено обслужване на клиентите, както и боравенето с множество и всеобхватни данни за анализ, които дават възможност за идентифициране на нови бизнес възможности и за растеж. Освен тези положителни въздействия, съществуват и опасения, че дигиталните финанси могат да окажат отрицателно въздействие върху стабилността на финансовата система, особено по отношение на систематичния риск. Връзката между дигиталните финанси и финансовата стабилност може да се изследва чрез влиянието на цифровите финанси върху банковото дело като основна финансова институция във финансовата система. Като потенциалните отрицателни въздействия на цифровизацията върху финансовата функция може да посочим повишена изложеност на киберпрестъпност, провали в оперативната устойчивост и проблеми със защитата на данните и неприкосновеността на личния живот.

Целта, която си поставя Организацията на обединените нации в своите доклади *(United Nations, 2016)* е чрез финансовите услуги, предоставяни чрез цифрови платформи, е да допринесат за намаляване на бедността и да допринесат за постигане на целите за финансово приобщаване на развиващите се икономики. Дигиталните финанси и финансиране има потенциала да насърчи достъпа до официални финансови услуги за много лица в световен мащаб, чрез разработването и прилагането на нови бизнес модели за дигитално банкиране, като по този начин се разширява използването му и се подобрява качеството на финансовите услуги на много по-ниска цена и с по-голямо удобство.

Разбирането ми е, че дигиталните финанси следва да подобрят благосъстоянието на физическите лица и предприятията, които имат официални банкови сметки и разполагат със средства в банковите си сметки за извършване на множество финансови операции, само когато очакваните ползи надхърлят разходите за предоставяне на цифрови финансови услуги и те са незначителни или нулеви.

Както всяка монета има две лица, така и дигиталните финанси имат своите недостатъци, които са сравнително по-малко от положителните страни. Дигиталните финанси могат да помогнат на правителствата, регулаторите на финансовата и паричната система да упражняват контрол, като предоставят по-бързи ранни предупреждения, тъй като те също използват технологии в отчетността и базите данни. Ето защо можем да предложим хипотезата, че е налице положителен ефект на цифровите финанси върху стабилността на финансовата система.

Необходима е **финансова грамотност**, за да се образоват по-добре потребителите. Правителството ежегодно въвежда програми за финансово образование, понякога чрез министерството на образованието, а понякога чрез органите на финансовия сектор. За да се изяснят основните фактори, влияещи върху финансовата грамотност в дигиталният контекст, трябва да посочим, че увеличаването на финансовото приобщаване идва също така с крива на обучение, която трябва да бъде преодоляна, за да се извлекат пълни ползи от тях. Но все още не е ясно дали тези образователни програми се развиват достатъчно бързо в светлината на бързата дигитализация на финансовите услуги.

MONDAY - NOVEMBER 18th

09:30 - 10:00	**Registration/ Coffee**	
10:00 – 11:00	**Welcome speeches** *MAXIMA HALL* */In Bulgarian/*	**Prof. Dr. Dimitar DIMITROV,** Rector of UNWE, Bulgaria **Lyudmila PETKOVA -** Deputy Prime Minister and Minister of Finance **Dimiter RADEV,** *Governor of the Bulgarian National Bank* **Zornitsa ROUSSINOVA –** *Chairperson of the Economic and Social Council* **Petia DIMITROVA –** Chairperson of the Executive Board of the Association of Banks in Bulgaria **Nikolay NENOVSKY**, Director of MRC, UNWE, member of MB at BNB
11:00 – 12:30	**Roundtable discussion** *MAXIMA HALL* */In Bulgarian/*	**EURO IN BULGARIA – ON THE ROAD TO ACCEPTING THE EURO AS A NATIONAL CURRENCY /in Bulgarian/** **Moderator: Assoc. Prof. Dr. Yanko HRISTOZOV, Director of IEP, UNWE** *Participants:* **Metodi METODIEV** - *Deputy Minister of Finance* **Petar CHOBANOV** - Deputy governor and member of MB at BNB **Petia DIMITROVA -** *CEO and Chairperson of MB of Eurobank Bulgaria AD* **Tsvetanka MINCHEVA** - *CEO Unicredit Bulbank* **Nikola BAKALOV -** *CEO First Investment Bank* **Delyana IVANOVA** - *Chair of Supervisory Board Bulgarian Development Bank*
12:30-13:30	**Lunch/Coffee break**	
13:30 - 14:00	**Keynote speech 1** *Large Conference Hall* Link for online	**Moderator: Prof. D.Sc. Nikolay Nenovsky**, MRC, UNWE **Emilia Campeanu,** *Head of Finance Department at Bucharest University of Economic* studies */ Fiscal sustainability to sustainable economic development in the Era of digital transformation/*
14:00 – 15:15	**Presentation session 1** *Large Conference Hall* Link for online	**DIGITAL MONEY** **Moderator: Prof. D.Sc. Nikolay NENOVSKY,** Director of MRC, UNWE **Xiaopin Liang, Siyi Chen** *Hebei University of Economics and Business, China / Research on the Impact of Digital RMB Cross border Payment on RMB Internationalization/* **Saikak Moulaydriss**, *PhD in economics. Independent, Morocco,* **Sara Boughanou**, *Laboratoire economie appliqué, Fsjes Rabat Agdal University Mohamed V at Rabat Morocco /Central bank transparency and macroeconomic performance: evidence from Morocco/* **Alexander Orlov,** *RUDN, /Implementation of smart contracts secured by digital ruble into the Russian economy/* **Daniel Akhmetdzhanov, Daniil Beletsky, Polina Ivanova** *PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA, / The degree of implementation and development of the BRICS digital money system/*

15:15 – 15:30	**Coffee break**	
15:30 – 16:00	**Keynote speech 2** *Large Conference Hall* Link for online	**Moderator: Diyana Miteva, MRC, UNWE** **Jovan ZAFIROVSKI,** *Ss. Cyril and Methodius University, Skopie /Digital transformation and the monetary challenges in the post crisis period/*
16:00-18:00	**Presentation session 2** *Large Conference Hall* Link for online	**Moderator: Rossitsa Toncheva, MRC, UNWE** **Tatiana HOUBENOVA-DELISIVKOVA,** *ERI of the Bulgarian Academy of Sciences, Union of Economists / Bulgaria on the Road to the Eurozone: Nominal Convergence Criteria and Policies Adjustmen/*: **Iskra CHRISTOVA-BALKANSKA,** *ERI of the Bulgarian Academy of Sciences, /Real convergence of Bulgarian economy in the euro area: evidence and implications/* **Ljubomir GEORGIEV**, */Digital technologies, market frictions and financial system structure/* **Dimiter NENKOV, Diyana MITEVA,** UNWE */Determining the Cost of Equity in the Developing Capital Market of Bulgaria: Up-to-Date Approaches and Methods/* **Galia MANCHEVA,** UNWE */ EU AI ACT WENT LIVE: EUROPE ENTERED INTO NEW ERA/* **Levani KERESELIDZE,** *Ivane Javakhishvili Tbilisi State University, Georgia /On the Psychological Determinant of Personnel Management/* **Kiril TOCHKOV,** *Texas Christian University /Risk sharing and monetary policy in the Euro Area/*
TUESDAY - NOVEMBER 19th Link for online attendance		
09:30 – 10:00	**Keynote speech 3** *Large Conference Hall*	**Moderator: Diyana Miteva, MRC, UNWE** **Gordon KERR,** *Cobden Partners UK, /The dangers of policy focus on digital transformation/*
10:00 - 12:00	**Plenary Session 2** *Large Conference Hall*	**International financial architecture and the Bretton-Woods institutions** **Moderator: Daniela BOBEVA,** BAS **Participants:** **Geoff Gottlieb,** *Senior Resident Representative for Central and Eastern Europe, IMF /TBC* **Daniela BOBEVA,** BAS **Nikolay NENOVSKY,** MRC, UNWE / *The French plan of the Bretton Woods conference and its relevance today/* **Dr. Stefka Savova,** *World Bank/ Challenges for the world financial system/* **Tsvetan Manchev,** Sofia University, */ Challenges for the world financial system/* **Mikhail RAEV,** *PhD Sofia University / Leo Pasvolsky's ideas and role for the establishment of the IMF and the IBRD pre- and during WWII/*
12:00 – 13:00	**Lunch**	

13:00 – 14:30	**Session Presentation session 3** *Large Conference Hall*	**Moderator: Rossitsa Toncheva, MRC, UNWE** **Moustapha AMAN,** *Associate Researcher, LEFFMI, University of Picardy Jules Verne /The Secret Chessboard of Superpowers: From Bretton Woods to the 21st Century – The Case of Djibouti./* **Dimiter CHOBANOV**, *IEP, UNWE /Fiscal Policies and Post-crisis Recovery in Central and Eastern European Countries/* **Tsvetelina MARINOVA** *New Bulgarian University /The Bulgarian economists on the collectivization and the socialist planning in the agriculture in the period 1945-1960/* **Nikolay BOGATZKY,** *Cusano University of Rome, /*Public Debt and Social Transformations: the Italian Case/ **Sarah GOLDMAN,** *Lux-SIR (Scientific International Research), Luxembourg /Natural Resources as a Key factor in forecasting GDP in Europe/*
14:30 – 14:45	**Coffee Break**	
14:30-15:30	***MAXIMA HALL*** Parallel session	**EURO CURRENCY CHALLENGES AND PERSPECTIVES** /in Bulgarian / **Moderator:** Yanko Hristozov, IEP, UNWE **Speakers:** **Dimiter SHOUMAROV,** *Deputy CEO, Chief Financial Officer and Member of the Management Board* **Lyubomir KARIMANSKI,** IEP, UNWE /The different dimensions of the Digital Euro and its cross-border interoperability./ **Stefan TZVETKOV**, BNB
14:45-17:30	**Parallel sessions : Presentation session 5** *Large Conference Hall*	**Moderator: Diyana Miteva, MRC,UNWE** **Bo Shen, Zihao Wang, Xiying Zhang, Guijun Li** *Hebei University of Economics and Business, China The impact of the combination of science and technology and finance on economic resilience-Empirical evidence based on the quasi-natural experiment of " promoting the combination of science and technology and finance "/* **Borislav BORISOV**, *IEP/ ACHIEVEMENTS AND PROBLEMS IN IMPLEMENTING INNOVATIONS IN MUNICIPAL FINANCE /* **Anna VERENIKINA**, *RUDN University, Russia /Development of ESG bond market in Russia/* **Rossitsa TONCHEVA,** *MRC, UNWE /Money as collective public mechanism of wealth distribution: a piece of ontology/* **Spartak KEREMIDCHIEV**, *Economic Research Institute at Bulgarian Academy of Sciences/Protectionism and Liberalism in foreign Investments/* **Yanko HRISTOZOV,** IEP, UNWE, **Ani Dimitrova**, *IEP /Euro Adoption Challenges for Bulgaria and Croatia /* **Diyana METALOVA,** IEP,UNWE/ The new EU fiscal rules - an attempt to restore budgetary discipline/ **Diyana MITEVA**, *UNWE, /Digital challenges in investor protection /*

		Galya TASEVA, *UNWE /Cash holdings and indebtedness of publicly traded companies in Bulgaria during Covid-19 pandemic/* **Nelly POPOVA**, *UNWE, / Taxation of digital companies – current state and prospects/* **Gergana MIHAILOVA-BORISOVA,** *UNWE, / Mortgage Lending in Bulgaria/*
20:00 -22:30		**Official Dinner**
WEDNESDAY - November 20th Link for online		
09:00-11:00	**Plenary session 5** *Large Conference Hall*	**Moderator: Shouyi ZHANG, LEFMI, University of Picardie Jules Vernes** **Xinping Fu, Yuxuan Zheng,** *Hebei University of Economics and Business, China /Research on the efficiency and potential of China's agricultural exports to RCEP countries—Based on stochastic frontier gravity model/* **Yan Cai, Wei Li, Xiying Zhang, Hui Du** *Hebei University of Economics and Business, China /Is Household Education Spending an Investment or Consumption? A Perspective on Family Resilience/* **Danni Lang, Xiying Zhang, Meng Zhao** *Hebei University of Economics and Business, China /The Impact of the Establishment of Pilot Free Trade Zones on the High-Quality Development of China's Agricultural Product Trade/* **Zijing Jin, Zipeng Hui, Xiaopei Liu** *Hebei University of Economics and Business, China /Research on internationalization docking of China's digital trade rules in post-crisis period/* **Shuai Cui, Xiaoran Zhao, Jiaxi Tian, Xiying Zhang** *Hebei University of Economics and Business, China /Cross-border e-commerce, digital finance and economic resilience/* **Shouyi ZHANG,** *LEFMI, University of Picardie Jules Vernes /Distributed Ledger Technology for reinforcement of Sovereignty and Legitimacy: Chinese tradition on History Record/* **Iana PALIOVA**, *ERI of the Bulgarian Academy of Sciences/ The benefits of digital transformation for government/*
11:00 -11:30	**Coffee Break**	
11:30-11:45	**PRICE GIVING CEREMONY** *Large Conference Hall*	**Giving award to winners of student essays contest of Institute of Economics and Politics–** **Yanko HRISTOZOV**, Director of IEP, **Gergana MIHAILOVA**, Head of Department of Finance, UNWE
11:45-13:30	**Plenary session 5** *Large Conference Hall*	**Moderator: Yanko HRISTOZOV, Rossitsa TONCHEVA, MRC,UNWE** **PHD and Student session /Part 1/** **Elitsa KANTARDZIEVA**, PhD student, Plovdiv university /*INTERNATIONAL FINANCIAL INSTITUTIONS AS CROSS POINT OF SEVERAL THEORIES/*

		Stoyan Stoyanov, UNWE /Potential consequences of it disruptions on the value of companies/ **ANTONINA Toncheva** */The Digital Euro: A Catalyst for Economic Recovery and Digital Transformation in the Post-Crisis Period/* ***DINIȘOAE Silviu Maximus, IDITA Bogdan-Florin, LAZĂR Alexia**, Bucharest University of Economic Studies/ AI and the Future of Labor Markets in the EU/* **Yana PAVLOVA, UNWE, /** Monetary policy in the post-crisis period**/** **Danka KAPSAZOVA,UNWE /** Environmental, social and solidarity economy/
13:30-14:30	**Lunch**	
14:30-17:00	**Parallel Session** **Plenary session 5** *Large Conference Hall*	**Moderator: Rossitsa Toncheva, MRC, UNWE** **PHD and Student session /Part 2/** **Simona Bojinovska,** *PhD, Skopie University /tbc/* **STOIAN Mihaela, TUDOR Robert-Cristian, ȚUVEC George,** *Bucharest University of Economic Studies/ Analysis of the evolution of income inequality – causes and effects. Comparative analysis: Romania - EU27/* **NĂFORNIȚĂ Claudiu, ZHU Yao-Guo-Iulian, KAREEM Nofal, SHAMSAN Amr Adel Ameen**, *Bucharest University of Economic Studies/ Informational effects of Finance & Monetary Economics/* ***ȘEICĂRESCU Lavinia, STRUGARIU Lorena-Sunamita,** Bucharest University of Economic Studies / Case study: the importance of monitoring public finances. Why efficiency matters and how the population is directly affected by the state's decisions/* **OBREJA Carmen, STOICA Naty-Cristina-Georgiana, BUHUȘ Marius-Iulian, MITU Florin, AVRĂMESCU Adelin-Florian**, *Bucharest University of Economic Studies / tbc/*
14:30-17:00	**Parallel Session** **Plenary session 6** *Small Conference Hall*	**Moderator: Diyana Miteva, MRC, UNWE** ***Gabriela* KRASTEVA**, *UNWE /Digital Finance/* **BUSUIOC Cristian, BALAN Cristian, VOLCOV Alexandru, BUNEA Teodora- Gabriela, BUDA Paula-Gabriela**, *Bucharest University of Economic Studies / tbc/* **RADU Daria-Maria, PIRNEA Carla-Ștefania, STAMATIN Dragoș-George, RUZSA Darius-Ionuț**, *Bucharest University of Economic Studies / tbc/ '* **MUNTEANU Ana-Cristiana, VADUVA Jack James, RADU Andrei**, *Bucharest University of Economic Studies / tbc/* ***DERMENJI Nicoleta, COBÎLEANSCHI Daniel, COȚOFAN Artur**, Bucharest University of Economic Studies, /The financial crisis of Greece: from collapse to recovery/*
17:00-17:15	**Closing remarks** *Large Conference Hall*	**Nikolay NENOVSKY, Yanko Hristozov, Tatyana HOUBENOVA-DELISIVKOVA, Diyana MITEVA**