Banks Step Back and Private Lenders Step Forward: Examining the Substitution Effect of Public and Private Corporate Credit

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Abstract

Over the past two decades, private credit has grown rapidly as a source of corporate lending, particularly after banks became more cautious following the global financial crisis. Using country-level data from the Bank for International Settlements, this paper examines how changes in bank credit are related to changes in non-bank credit within countries over time.

The results show that bank credit is strongly related to overall credit growth. However, once total credit is separated into bank and non-bank components, changes in bank lending are not matched by opposite changes in non-bank credit. This suggests that private credit does not consistently replace bank lending. Instead, bank and non-bank credit typically rise and fall together, indicating that substitution between the two is limited and does not occur as a general pattern.

1. Introduction

1.1 Motivation

Over the past two decades, global credit markets have experienced not only an expansion in total lending, but a significant shift in *how* credit is supplied. While overall credit to the private non-financial sector has continued to grow, an increasing share of that credit now comes outside traditional banking and public capital market channels. More specifically, private credit, which is non-bank, privately negotiated lending, has expanded rapidly as banks have halted lending to certain borrowers in the debt market.

This paper argues that the rise of private credit should be interpreted in large part as a substitution effect rather than as a direct parallel relationship. Rather than asking why private credit grows, the analysis focuses on whether private credit expands *because* public bank credit becomes restricted. Following the global financial crisis of 2008, banks faced higher capital requirements and tighter leverage restrictions. The Bank for International Settlements (BIS) demonstrates that these changes increased the cost of balance-sheet lending and reduced banks' willingness to lend to mid-sized firms and higher-risk borrowers (BIS, 2025).

At the same time, public bond markets became less accessible for many firms. These developments did not eliminate the demand for credit. Instead, they changed the channels through which credit was supplied. Private credit funds and other non-bank lenders have stepped in to provide financing to borrowers who could no longer rely on banks or public markets. Because of this, there is a chance that private credit demand may be *correlated* from constraints on public credit supply.

This paper is the second in a broader series examining the growth of private credit. Whereas the first paper focused on macroeconomic and institutional drivers such as monetary policy and information-sharing institutions, this paper isolates a distinct mechanism: substitution away from public corporate lending. Establishing whether private credit systematically replaces public credit is a necessary step before evaluating the consequences of private credit growth for financial stability, transparency, and regulation.

1.2 Research Question

Does private credit grow faster in countries and periods where public bank credit declines or becomes more restricted? More specifically, when bank lending to the private non-financial sector weakens within a country, does private credit expand to compensate?

Answering this question clarifies whether private credit is replacing banks in lending or whether private and bank credit tend to expand and contract together in response to common shocks.

1.3 Hypotheses

Private credit increases relative to bank credit during periods in which bank lending weakens, consistent with the possibility of substitution between public and private lending vehicles.

1.4 Contribution

This paper describes the rise of private credit as a shift within credit markets driven in part by restrictions on public bank lending due to regulatory tightening. By isolating the substitution mechanic, it clarifies the role private credit plays in the larger credit market when traditional large scale banks step back.

2. Literature Review

2.1 Bank Lending and the Pullback in Public Corporate Credit

The BIS examined a large decrease in bank lending following the global financial crisis in 2008. The BIS emphasizes that tighter capital requirements, liquidity regulation, and stress testing of credit has reduced banks' tolerance for higher risk assets (junk bonds), particularly loans to mid-sized firms and borrowers without specific characteristics that don't fit into the lending model (BIS, 2025). Importantly, this decline reflects restrictions on credit supply rather than a reduction in firms' demand for financing.

From this perspective, reduced bank lending doesn't imply a decrease in borrowing. Instead, it changes the demographic of the groups supplying credit. When banks are restrained by regulation or balance-sheet considerations, borrowers seek alternative ways to finance, creating space for non-bank lenders to expand.

2.2 Private Credit as a Substitute for Bank Lending

Recent BIS cross-country evidence shows that private credit markets tend to be larger in economies where banking systems are less efficient. This pattern is consistent with private credit filling gaps left by banks rather than simply expanding credit in parallel (BIS Total Credit Statistics).

Additional evidence from the Federal Reserve Bank of Boston highlights growing competition between private credit funds and banks in commercial and industrial lending as well as in segments traditionally dominated by syndicated loans (Rosengren, 2025). Their findings suggest that private credit grows fastest during periods of tighter bank lending conditions, which aligns with the substitution hypothesis examined in this paper.

2.3 Transparency and Measurement Differences

Alongside its growth, private credit has raised concerns related to transparency and risk measurement. Unlike bank loans and public bonds, private credit instruments are not traded on public markets and are often held by lightly regulated investment vehicles. As a result, loan valuations and returns are typically reported by fund managers themselves rather than revealed through market prices.

Recent debate surrounding large private credit managers, most prominently Blue Owl Capital, has grown concerns about reporting standards and transparency within private credit markets. Blue Owl, one of the largest global private credit platforms, has been cited in both academic and

market commentary as symbolic of the opacity of the newly developed asset class reporting. (Kaur, 2026)

This reporting structure has led to two main concerns. First, reported private credit returns often appear unusually smooth relative to public credit returns. Analysts have said that this smoothness may reflect valuation timing rather than genuinely lower underlying risk. Secondly, differences in disclosure practices across managers complicate comparisons among private credit lending risk assessment. Larger firms like Blue Owl provide large amounts of qualitative reporting, however, the absence of standardized, market-based pricing limits the validity of portfolio risk.

These reporting practices have begun to create rifts within the private credit ecosystem itself. Institutional investors, regulators, and banks have grown to view private credit lenders with more conservative valuation practices and those who might be relying too much on discretion. At the same time, banks and public-market participants have raised concerns that private credit risk may be growing rapidly without an equivalent increase in transparency.

In the context of this paper, these debates help to understand an important implication of the substitution mechanism. If private credit is systematically replacing bank lending, then credit risk may be shifting from a highly regulated and transparent sector to one where risks are harder to observe in real time. Understanding whether private credit fills gaps left by banks is therefore not only a question of credit availability, but also one of financial stability and supervisory reach.

3. Data

3.1 Credit Measures

The analysis uses data from the Bank for International Settlements Total Credit Statistics, which categorizes credit to the private non-financial sector by lending type. The dependent variable is private credit, measured as non-bank credit to the private non-financial sector as a percentage of GDP. The key independent variable is bank credit, measured as bank credit to the private non-financial sector as a percentage of GDP. (Bank for International Settlements, 2026).

Using a single data source allows for cross-country consistency in measurement and allows for a direct comparison between public bank credit and private credit.

3.2 Macroeconomic Controls

The model includes standard macroeconomic controls taken from the World Bank World Development Indicators database:

- GDP per capita (constant USD)
- Inflation (annual CPI)
- Real GDP growth (annual)

These controls account for macroeconomic factors that may influence both bank and private credit simultaneously. (World Bank, n.d.).

Summary statistics for the full sample are reported in Appendix Table A2.

4. Empirical Models

$$PrivateCredit_{i,t} = \alpha_i + \beta_1 BankCredit_{it} + Controls_{it} + \varepsilon_{it}$$

$$NonBankCredit_{i,t} = \alpha_i + \beta_1 BankCredit_{it} + Controls_{it} + \varepsilon_{it}$$

Where α_i denotes country fixed effects.

4.1 Specification

The model employs a two-way fixed-effects framework. Country fixed effects control for time-invariant factors such as macroeconomic financial development and institutional quality.

Identification comes from within-country variation over time. The specification asks whether private credit increases in years when bank credit declines within the same country.

4.2 Interpretation of Coefficients

The coefficient on bank credit measures whether changes in bank lending are associated with opposite movements in non-bank credit. A negative and statistically significant coefficient would mean that non-bank credit tends to expand when bank credit contracts, which would be consistent with substitution. A coefficient close to zero indicates that bank and non-bank credit move together in response to common economic conditions.

4.3 Identification Strategy

While fixed effects and macroeconomic controls reduce omitted-variable bias, the analysis does not fully establish a causal relationship. Unobserved shocks could affect both bank and private credit simultaneously. That being said, the specification provides a transparent test of whether consistent patterns of substitution emerge systematically across countries.

4.4 Fixed Effects vs Random Effects

Both fixed-effects and random-effects specifications were considered. A Hausman test was conducted to assess whether the random effects estimator is consistent. The results reject the null hypothesis that the random effects estimator is appropriate, indicating that unobserved country-specific effects are correlated with the explanatory variables (see Appendix Table A3). The fixed effects model is preferred.

Because non-bank credit is constructed directly from total private credit and bank credit, the same fixed-effects structure is applied to all specifications. The Hausman test for the baseline model supports the use of fixed effects throughout.

4.5 Omitted Variable Bias

Several steps are taken to mitigate omitted variable bias. Country fixed effects control for unobserved time-invariant characteristics, while macroeconomic controls account for observable time-varying factors that may influence private credit. In the monetary policy specification, year fixed effects further reduce the risk of bias from global shocks. Standard errors are clustered to account for serial correlation and heteroskedasticity within countries over time.

4.6 Rationale for Separate Regression Specifications

As a first step, I estimate a fixed-effects regression that relates total private credit to bank credit. This regression shows a strong and statistically significant positive relationship. When bank credit rises by one percentage point of GDP, total private credit rises by about 1.19 percentage points. This result is expected. Bank credit is a large part of total credit, and both usually grow during market upturns. As a result, this specification mainly captures overall credit expansion rather than substitution across different lending channels.

To better examine substitution, I separate total credit into bank credit and non-bank credit and re-estimate the model using non-bank credit as the dependent variable. This allows the analysis

to focus on whether non-bank lenders increase their lending when banks reduce theirs within the same country over time.

This regression should be interpreted carefully. It does not prove a causal relationship of substitution. Instead, it asks a simpler question: when bank lending changes, does non-bank lending move in the opposite direction, or do the two move together? If private credit were systematically replacing bank credit, the coefficient on bank credit would be negative and statistically significant. If the two types of credit respond to the same economic forces, the coefficient would be close to zero.

The results show that the coefficient on bank credit is small and not statistically significant. This means that changes in bank lending are not consistently followed by opposite changes in non-bank credit. In practice, when bank credit rises or falls, non-bank credit does not reliably move in the other direction.

Together, these results suggest that bank credit and non-bank credit usually respond to common macroeconomic and financial conditions rather than acting as substitutes for one another at the aggregate level. While total credit growth is closely linked to bank lending, changes in bank credit do not appear to systematically change the share of credit provided by non-bank lenders. This implies that substitution between banks and private credit, if it occurs, is likely limited to specific situations such as periods of financial stress or specific types of borrowers and is not visible in average country-level data.

5. Results

Appendix Table A4 reports fixed effects estimates of the relationship between bank credit and total private credit, while Appendix Table A5 reports estimates from a specification in which non bank credit, defined as total private credit minus bank credit, is the dependent variable. All specifications include country fixed effects, standard macroeconomic controls, and standard errors clustered at the country level.

Appendix Table A4 shows a strong and positive association between bank credit and total private credit. The estimated coefficient of 1.187 is statistically significant at the one percent level, meaning that a one percentage point increase in bank credit as a share of GDP is associated with an approximately 1.19 percentage point increase in total private credit. This result reflects parallel movement between bank lending and overall credit conditions and is consistent with the view that bank credit expands alongside overall credit growth during upward movement within the economy. Because bank credit is within the total private credit measure, this specification primarily captures joint expansion rather than substitution in credit lending.

Appendix Table A5 directly tests the substitution hypothesis by using non bank credit as the dependent variable. In this specification, the coefficient on bank credit is positive but small in magnitude and statistically insignificant. This means, within countries over time, changes in

bank lending are not systematically offset by opposing movement in non bank credit. In other words, there is no evidence of bank credit lenders being replaced non bank lenders.

Across both specifications, the macroeconomic control variables demonstrate similar patterns. GDP per capita enters positively and is statistically significant, which is consistent with higher levels of financial development in wealthier economies. Inflation and real GDP growth do not display statistically significant relationships with either total private credit or non bank credit once country fixed effects are included, which means that short term macroeconomic "noise" does not drive the observed patterns in the overall credit landscape.

Using the findings from both specifications, the results indicate that bank based and non bank credit tend to move together rather than substitute for one another. While total credit growth is closely linked to bank lending, expansions or contractions in bank credit do not seem to change the share of non bank credit within the same period. These findings suggest that any substitution between banks and private credit is likely to be abnormal, varying across periods of stress, or borrower types, rather than a consistent effect of credit dynamics.

6. Limitations

This study has several drawbacks that must be considered when interpreting the results. First, the analysis is conducted at the country level. While this approach allows for broad cross-country comparisons, it may not clearly show substitution effects that occur within specific borrower segments, such as middle market firms or highly leveraged corporations.

Second, the number of countries in the balanced panel is limited. Although the time horizon is long, the small cross-sectional dimension reduces statistical power and may limit the explanatory power of the results.

Third, the analysis focuses on relationships between bank and non bank credit. Substitution effects may occur with lags within the data, particularly if borrowers transition gradually from bank lending to private credit markets.

7. Conclusion

This paper studies whether the growth of private credit reflects a shift away from public bank lending. Using cross-country panel data and a fixed effects framework, the results show that although bank credit is closely tied to overall credit growth, changes in bank lending are not consistently offset by changes in non-bank credit.

These findings suggest that private credit does not act as a general replacement for bank lending at the aggregate level. Instead, both types of credit appear to respond to common macroeconomic and financial conditions. Any substitution between banks and private lenders is therefore likely limited to specific circumstances, such as regulatory changes or periods of financial stress, and may not be visible in country-level data.

Future research could build on this analysis by using firm-level or loan-level data to explore whether substitution occurs more sharply among specific borrower classes, such as leveraged firms or middle-market borrowers. Additionally, examining financial crisis periods or regulatory shocks in more detail may also help identify different cases where nonbank lending might actually substitute for bank lending.

Appendix

Appendix A: Tables

Table A1. Variable Definitions

Variable Name	Definition	Units	Source
PrivateCredit	Private credit to private non-financial sector (% of GDP)	Percent of GDP	BIS Total Credit Dataset
BankCredit	Public credit to private non-financial sector (% of GDP)	Percent of GDP	BIS Total Credit Dataset
GDPpc	GDP per capita (constant USD)	USD	World Bank WDI
Inflation	Annual CPI inflation rate	Percent	World Bank WDI
GDPgrowth	Real GDP growth (annual %)	Percent	World Bank WDI

Table A2. Summary Statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Privatecredit	768.000	134.454	62.224	21.100	349.200
Bankcredit	768.000	71.287	35.536	10.900	157.900
GDPpc	768.000	34,317.485	19,808.569	316.740	90,605.019
Inflation	768.000	4.476	4.217	-7.634	31.017
GDPgrowth	768.000	2.957	2.575	-8.205	11.201
NonBankcredit	768.000	63.167	39.355	4.300	236.100

Table A3. Hausman Test

	(1)	(2)
VARIABLES	Fixed Effects	Random Effects
Bankcredit	1.187***	1.186***
	(0.036)	(0.036)
GDPpc	0.001***	0.001***
	(0.000)	(0.000)
Inflation	-0.039	-0.043
	(0.188)	(0.187)
GDPgrowth	-0.606**	-0.608**
	(0.286)	(0.285)
Constant	13.448***	13.606
	(3.117)	(9.993)
Observations	768	768
R-squared	0.868	
Number of country_id	12	12
Hausman Test	Reject RE	Reject RE
Model Used	Fixed Effects	Fixed Effects

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

Table A4. Private Credit Independent Variable Specification

VARIABLES	(1) Bank Credit and Private Credit (Fixed Effects)
Bankcredit	1.187***
	(0.180)
GDPpc	0.001**
	(0.000)
Inflation	-0.039
	(0.305)
GDPgrowth	-0.606
	(0.402)
Constant	13.448
	(16.791)
Observations	768
Number of country_id	12
R-squared	0.868
Country FE	Yes
Clustered SE	Yes

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

Table A5. Nonbank Credit Independent Variable Specification

VARIABLES	(1) Bank Credit and Non-Bank Credit (FE)
Bankcredit	0.187
	(0.180)
GDPpc	0.001**
	(0.000)
Inflation	-0.039
	(0.305)
GDPgrowth	-0.606
	(0.402)
Constant	13.448
	(16.791)
Observations	768
Number of country_id	12
R-squared	0.495
Country FE	Yes
Clustered SE	Yes

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

Appendix B: Dofiles

Appendix B1: Cleaning Dofiles (Note: AI used for cleaning)

Appendix B1a: BIS Cleaning

```
/*******************************************************************************
***********
  BIS Private Credit — Final Clean (EOY/Q4) with model-aligned names (no underscores)
  Input  : /Users/zackrivitz/Downloads/BISNOTCLEAN.csv   (BIS "CSV, flat")
  Outputs (into your iCloud Desktop subfolder):
    1) /Users/zackrivitz/Desktop/EC 406/FINAL PAPER EC406
DOFILES/bis_private_credit_panel_annual_eoy.dta/.csv
    2) /Users/zackrivitz/Desktop/EC 406/FINAL PAPER EC406
DOFILES/bis_private_credit_panel_annual_eoy_regready.dta/.csv

  Model variables (unit = Percentage of GDP; end-of-period; market value):
    Privatecredit = Total credit to the private non-financial sector (PNFS); all lenders
    Bankcredit    = Bank credit to PNFS; domestic banks only

  Notes:
    • Annualization = keep the last available quarter per year (EOY, typically Q4).
    • Drop 2025 so the sample is strictly EOY; re-enable when 2025Q4 is available.
*******************************************************************************
**********/

* ----------------------------
* 0) Session & paths
* ----------------------------
clear all
set more off
set varabbrev off
version 18

* INPUT
global RAW "/Users/zackrivitz/Downloads"
global INFILE "BISNOTCLEAN.csv"

* OUTPUT — absolute path to the folder in your screenshot:
global OUT "/Users/zackrivitz/Desktop/EC 406/FINAL PAPER EC406 DOFILES"

* If your Mac resolves iCloud Desktop via the container path instead, use this line:
* global OUT "/Users/zackrivitz/Library/Mobile
Documents/com~apple~CloudDocs/Desktop/EC 406/FINAL PAPER EC406 DOFILES"

* Ensure the folders exist (create parent and target if needed)
cap mkdir "/Users/zackrivitz/Desktop/EC 406"
```

```
cap mkdir "$OUT"

* ------------------------------
* 1) Import BIS CSV (flat/long)
* ------------------------------
import delimited using "$RAW/$INFILE", varn(1) clear
rename *, lower

* ------------------------------
* 2) Canonicalize header names (BIS sometimes concatenates code+label)
* ------------------------------
ds time*period*
local tp `r(varlist)'
local n : word count `tp'
if `n'>0 rename `: word 1 of `tp'' time_period

ds obs*value*
local ov `r(varlist)'
local n : word count `ov'
if `n'>0 rename `: word 1 of `ov'' obs_value

ds bor*cty*
local bc `r(varlist)'
local n : word count `bc'
if `n'>0 rename `: word 1 of `bc'' borrowers_cty

ds *borrowing*sector*
local bs `r(varlist)'
local n : word count `bs'
if `n'>0 rename `: word 1 of `bs'' borrowingsector

ds *lending*sector*
local ls `r(varlist)'
local n : word count `ls'
if `n'>0 rename `: word 1 of `ls'' lendingsector

ds *valuation*method*
local vm `r(varlist)'
local n : word count `vm'
if `n'>0 rename `: word 1 of `vm'' valuationmethod

ds *unit*type*
local ut `r(varlist)'
local n : word count `ut'
if `n'>0 rename `: word 1 of `ut'' unittype
```

```
ds *adjust*
local aj `r(varlist)'
local n : word count `aj'
if `n'>0 rename `: word 1 of `aj'' adjustment

* ------------------------------
* 3) Keep PNFS + Market value + Adjusted + % of GDP
* ------------------------------
tostring unittype, replace force

keep if strpos(lower(borrowingsector),"private non-financial sector")>0 ///
  | strpos(lower(borrowingsector),"private nonfinancial sector")>0

keep if strpos(lower(valuationmethod),"market value")>0
keep if strpos(lower(adjustment),"adjusted")>0
keep if strpos(lower(unittype),"percentage of gdp")>0 | strpos(unittype,"770")>0

* ------------------------------
* 4) Parse time & standardize value
*    time_period like "YYYY-Qn" -> year + quarter (robust regex)
* ------------------------------
gen year = real(substr(time_period,1,4))
gen quarter = .
quietly replace quarter = real(regexs(1)) if regexm(time_period,"Q([1-4])$")

cap destring obs_value, replace force
cap rename obs_value value

drop if missing(year) | missing(quarter)

tempfile base
save `base', replace

* ------------------------------
* 5) TOTAL -> EOY per country-year (last available quarter)
*    Privatecredit = total credit to PNFS (% of GDP; all lenders)
* ------------------------------
preserve
use `base', clear
keep if strpos(lower(lendingsector),"all sectors")>0
keep borrowers_cty year quarter value
sort borrowers_cty year quarter
bys borrowers_cty year: keep if _n==_N
rename value Privatecredit
tempfile total
save `total', replace
```

```
restore

* ------------------------------
* 6) BANKS -> EOY per country-year (last available quarter)
*    Bankcredit = bank credit to PNFS (% of GDP; domestic banks)
* ------------------------------
preserve
use `base', clear
keep if strpos(lower(lendingsector),"banks")>0
keep borrowers_cty year quarter value
sort borrowers_cty year quarter
bys borrowers_cty year: keep if _n==_N
rename value Bankcredit
tempfile bank
save `bank', replace
restore

* ------------------------------
* 7) Merge TOTAL & BANK; compute nonbank fields (full panel only)
* ------------------------------
use `bank', clear
merge 1:1 borrowers_cty year using `total', nogen

gen Nonbankcredit         = Privatecredit - Bankcredit
gen Nonbank_to_bank_ratio = Nonbankcredit / Bankcredit if Bankcredit<. & Bankcredit!=0
gen Nonbankcredit_plot    = max(Nonbankcredit, 0)   // for charts; raw kept intact

* ------------------------------
* 8) Country code (ISO-2); drop BIS aggregates
* ------------------------------
gen iso2 = upper(substr(borrowers_cty,1,2))
drop if !regexm(iso2,"^[A-Z]{2}$")
drop if inlist(iso2,"5A","5R","4T","G2","XM")
drop borrowers_cty

* ------------------------------
* 9) Enforce pure EOY (drop 2025 for now)
* ------------------------------
drop if year==2025

* Auto-guard (optional): uncomment once 2025Q4 is out
* bys iso2 year: egen __lastq = max(quarter)
* quietly summarize year
* local __ymax = r(max)
* drop if year==`__ymax' & __lastq<4
* drop __lastq
```

```
* ------------------------------
* 10) Labels (names match model; unit in labels)
* ------------------------------
label var iso2                "ISO-2 country code"
label var year                "Calendar year (EOY selection: last available quarter per year)"
label var Privatecredit       "Total credit to PNFS, % of GDP; end-of-period; market value; all
lenders (BIS)"
label var Bankcredit          "Bank credit to PNFS, % of GDP; end-of-period; market value;
domestic banks (BIS)"
label var Nonbankcredit       "Non-bank credit to PNFS (= total - bank), % of GDP; raw"
label var Nonbankcredit_plot  "Non-bank credit to PNFS (floored at 0 for charts), % of GDP"
label var Nonbank_to_bank_ratio "Non-bank / Bank credit ratio"
label data "BIS Credit to PNFS (EOY/Q4), market value, % of GDP; model-aligned names"

* ------------------------------
* 11) Save FULL panel (into FINAL PAPER EC406 DOFILES; overwrite)
* ------------------------------
order iso2 year Privatecredit Bankcredit Nonbankcredit Nonbankcredit_plot
Nonbank_to_bank_ratio quarter
sort iso2 year
compress
save "$OUT/bis_private_credit_panel_annual_eoy.dta", replace
export delimited using "$OUT/bis_private_credit_panel_annual_eoy.csv", replace

* ------------------------------
* 12) Create REG-READY subset (only iso2 year Privatecredit Bankcredit)
* ------------------------------
keep iso2 year Privatecredit Bankcredit
order iso2 year Privatecredit Bankcredit
sort iso2 year

* Labels for compact file
label var iso2        "ISO-2 country code"
label var year        "Calendar year (EOY selection: last available quarter per year)"
label var Privatecredit "Total credit to PNFS, % of GDP; end-of-period; market value; all lenders
(BIS)"
label var Bankcredit  "Bank credit to PNFS, % of GDP; end-of-period; market value; domestic
banks (BIS)"

compress
save "$OUT/bis_private_credit_panel_annual_eoy_regready.dta", replace
export delimited using "$OUT/bis_private_credit_panel_annual_eoy_regready.csv", replace

* ------------------------------
* 13) Quick QA (safe to run; no extra ado)
```

```
* ------------------------------
use "$OUT/bis_private_credit_panel_annual_eoy.dta", clear

count
quietly levelsof iso2, local(_countries)
local _n_countries : word count `_countries'
di as txt "Unique countries: `=_n_countries'"

tab quarter
gen __calc_nonbank = Privatecredit - Bankcredit
count if Nonbankcredit<0
count if (abs(__calc_nonbank - Nonbankcredit)>1e-6) & !missing(__calc_nonbank,
Nonbankcredit)
drop __calc_nonbank
```

Appendix B1b: WDI Controls Cleaning

```
clear all
set more off
set varabbrev off
version 18

* ---------------------------- INPUTS ----------------------------
* Your standard locations (exactly your pattern)
global RAW   "/Users/zackrivitz/Downloads"
global INFILE "BISNOTCLEAN.csv"   // not used here; just showing consistency

* OUTPUT — the folder from your screenshot (iCloud Desktop normal mount)
global OUT "/Users/zackrivitz/Desktop/EC 406/FINAL PAPER EC406 DOFILES"
* If your Mac uses the iCloud container path instead, use the next line:
* global OUT "/Users/zackrivitz/Library/Mobile
Documents/com~apple~CloudDocs/Desktop/EC 406/FINAL PAPER EC406 DOFILES"

* Ensure the folder exists (quotes are important because of spaces)
cap mkdir "/Users/zackrivitz/Desktop/EC 406"
cap mkdir "$OUT"

* --------------------------- LOAD WDI ----------------------------
* Prefer the .dta in current working folder; else try CSV; else fall back to Downloads
capture confirm file "wdi_controls_cleaned.dta"
if !_rc {
   use "wdi_controls_cleaned.dta", clear
}
else {
   capture confirm file "wdi_controls_cleaned.csv"
   if !_rc {
      import delimited using "wdi_controls_cleaned.csv", varnames(1) clear
   }
   else {
      * try Downloads
      capture confirm file "$RAW/wdi_controls_cleaned.dta"
      if !_rc {
         use "$RAW/wdi_controls_cleaned.dta", clear
      }
      else {
         capture confirm file "$RAW/wdi_controls_cleaned.csv"
         if !_rc {
            import delimited using "$RAW/wdi_controls_cleaned.csv", varnames(1) clear
         }
         else {
            di as error "Could not find wdi_controls_cleaned (.dta or .csv) in cwd or $RAW"
```

```
            exit 601
        }
    }
  }
}

* -------------------------- FIX YEAR --------------------------
* Ensure numeric types
foreach v in year GDPpc Inflation GDPgrowth {
   capture confirm numeric variable `v'
   if _rc destring `v', replace force
}

* WDI long files created from wide columns start at 1960,
* but your current export uses 0..66 indexing; convert only if needed.
summ year, meanonly
if (r(min) < 1900 | r(max) < 1900) {
   replace year = year + 1960    // map 0->1960, 1->1961, ...
}

* Basic sanity and tidy
assert year >= 1900 & year <= 2100
order iso3 year GDPpc Inflation GDPgrowth
sort  iso3 year
compress

* -------------------------- SAVE HERE --------------------------
cd "$OUT"
save "wdi_controls_cleaned.dta", replace
export delimited using "wdi_controls_cleaned.csv", replace

di as result "✓ Saved: $OUT/wdi_controls_cleaned.dta"
di as result "✓ Saved: $OUT/wdi_controls_cleaned.csv"
```

Appendix B2: Final Dofile (Merging used AI)

```
/*******************************************************************************
  Substitution Test: Bank Credit vs Non-Bank Private Credit
  Stata version: 17.0
*******************************************************************************/

version 17.0
clear all
set more off

* ---------------------------- Paths ----------------------------------------
local ICLOUD_ROOT "///Users/`c(username)'/Library/Mobile
Documents/com~apple~CloudDocs/Desktop"
local OUT_DIR "`ICLOUD_ROOT'/EC 406/FINAL PAPER EC406 DOFILES"

* ---------------------------- Load data ------------------------------------
use "`OUT_DIR'/merged_panel.dta", clear

* Keep relevant variables
keep iso3 year Privatecredit Bankcredit GDPpc Inflation GDPgrowth

* Construct non-bank credit
gen NonBankcredit = Privatecredit - Bankcredit

* Drop invalid observations (negative or missing)
drop if NonBankcredit < 0
egen miss = rowmiss(NonBankcredit Bankcredit GDPpc Inflation GDPgrowth)
drop if miss > 0
drop miss

* Panel setup
encode iso3, gen(country_id)
xtset country_id year

* Enforce balanced panel (for this specification)
bys country_id: gen T = _N
egen Tmax = max(T)
keep if T == Tmax
drop T Tmax
xtset country_id year

save "`OUT_DIR'/balanced_nonbank_substitution.dta", replace

*
================================================================================
======
```

```
* Summary Statistics (outreg2)
*
================================================================================
======

outreg2 using "`OUT_DIR'/table_summary_stats_nonbank.doc", ///
    replace ///
    sum(log) ///
    keep(NonBankcredit Bankcredit Privatecredit GDPpc Inflation GDPgrowth) ///
    dec(3) ///
    title("Summary Statistics")

*
================================================================================
======
* Fixed Effects Regression (MAIN RESULT)
*
================================================================================
======

xtreg NonBankcredit Bankcredit GDPpc Inflation GDPgrowth, fe cluster(country_id)

outreg2 using "`OUT_DIR'/table_substitution_nonbank_FE.doc", replace ///
    ctitle("Bank Credit and Non-Bank Credit (FE)") dec(3) ///
    addtext("Country FE","Yes","Clustered SE","Yes")

*
================================================================================
======
* Hausman Test (DIAGNOSTIC)
*
================================================================================
======

xtreg NonBankcredit Bankcredit GDPpc Inflation GDPgrowth, fe
estimates store FE_SUB

xtreg NonBankcredit Bankcredit GDPpc Inflation GDPgrowth, re
estimates store RE_SUB

hausman FE_SUB RE_SUB, sigmamore
```

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