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No. 732

Robert S. Chirinko

The 'Secret Sauce'?:

Understanding The Success Of The State Bank Of North Dakota

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The 'Secret Sauce'?:
Understanding The Success Of The State Bank Of North Dakota

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April 2025

** This research was supported by a grant from the Government Finance Research Center (GFRC) at the University of Illinois at Chicago's College of Urban Planning and Public Affairs (CUPPA). This funding source had no role in study design, in the collection, analysis, and/or interpretation of the data, in the writing of the initial draft of the article, or in the decision to submit the article for publication. Researchers at the GFRC and CUPPA may offer comments while the work is in progress prior to publication. The author thanks Laura Kahn Brademeyer, Eric Breitenstein, Greg Cohen, Chris Condon, and Katie Richard for assistance in collecting and understanding data, Barbara Cohen, Riccardo De Bonis, Robert DeYoung, Doug Evanoff, Charles Goodhart, Gene Guill, Luigi Guiso, Hiro Ishise, Steve Maguire, Mike Pagano, Ned Prescott, Shigenori Shiratsuka, Chad Syverson, and Linda Vincent for discussions about banking and related matters, seminar participants at the Bank of Italy, House of Finance/Goethe University, and the Kaufman Center for Financial Policy Studies conference for comments on initial drafts, and the Einaudi Institute of Economics and Finance (Rome) and the Institute of Social and Economic Research (Osaka) for providing most pleasant environments in which to write this research paper. All errors, omissions, and conclusions remain the sole responsibility of the author, and the conclusions do not necessarily reflect the opinions of the organizations with which he is associated or who have provided financial support for this project.

The 'Secret Sauce'?:
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Abstract

Interest in the United States in creating banks owned and operated by the state has increased dramatically in recent years. In 2023 or 2024, legislation was introduced in eight states to start a bank. In 2019, similar legislation was enacted in California for the creation of municipal banks. Chicago's new mayor is evaluating plans for a city bank. An important development in favor of a state bank is the long and impressive record of the only state bank in the United States, the Bank of North Dakota (BND). It has been in existence for over a century and has been very profitable in recent years. On the surface, these facts present a strong case for starting a state bank addressing the financing needs for infrastructure, education, and underserved communities.

To gain a better understanding of BND's success and the possibilities for a successful state bank, this paper compares the financial performance of the BND to that of national commercial banks. Claims by the BND as to the sources of its success (low-cost deposits and lending acuity) are evaluated and rejected by the data. Instead, the BND's abnormal profitability is explained fully by the exceptional growth in the North Dakota economy (largely the fracking boom), its tax-free status, and shifting risk to the State of North Dakota. The former factor is not portable to other states; the latter two factors are merely taxpayer subsidies. There is no 'secret sauce.'

The BND is a well-run bank that contributes to the North Dakota economy and, after suitable adjustments, earns normal profits. Its organization as a state bank does not create any unique efficiencies, and the BND does not provide support for a special role for a state bank. Absent efficiencies, a state bank might be interpreted as a quasi-fiscal authority that is outside the control of the legislature and avoids balanced budget restrictions operational in North Dakota and 48 other states.

Keywords: state bank, public bank, local economic development, credit allocation

JEL codes: G21 (banks)
G28 (government policy, financial institutions)
H70 (state and local governments)

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> **Legislative intent**. The Legislature finds that there are significant public infrastructure, higher education, home loans, and small business development needs, including those involving minority- and women-owned business enterprises, of the state that are unmet.
>
> The **mission** of the bank is to use New York's depository assets in ways that afford most efficient use of taxpayer revenues and public resources for the benefit of the people and economy of the state.
>
> State of New York (2023, Article 17, section 254; boldface added)

I. Introduction

Interest in creating state banks in the United States has increased dramatically in recent years. In 2023 or 2024, legislation was introduced in eight states to start a bank owned and operated by the state.[1] Similar legislation was enacted in 2019 by California for the creation of municipal banks. In July 2023, the inaugural policy *Blueprint* for Chicago's new mayor proposed forming a task force "… to study the concept of, and develop recommendations on, the establishment of a Public Bank…" (Chicago For The People, 2023, p. 40). Whether a state or city bank will expand economic activity and enhance citizen welfare is strongly debated.[2]

There are several reasons why economic performance might be improved with the creation of a state bank. In all six proposals, the state bank would receive state deposits. These provide a low-cost and substantial source of funds; for example, the assets of the Illinois Fund to be deposited in a state bank of Illinois would be $19.8 billion at the end of 2024. Moreover, this transfer lowers operating costs since there is little need for branches to attract deposits. Relative to private banks, a state bank may be better embedded into communities, better positioned to understand the pool of potential borrowers, and thus able to enjoy a lower default rate due to its

[1] Arizona, Illinois, Massachusetts, New Hampshire, New York, Oregon, Washington, Wisconsin. Legislation was introduced in New Mexico in 2021 and 2022, and it is anticipated that similar legislation will be proposed in 2025.

[2] Chirinko (2022) reviews both sides of the debate by examining the historical record of state and public banking and the policy proposals for six U.S. states, as well as the legislation enacted in California.

lending acuity. A large state bank could service small banks by acting as a "bankers' bank" providing liquidity and other banking services and, unlike large nation-wide banks, could credibly commit to supply funding during economically challenging times. Additionally, by pooling loans from across the state, the state bank would reduce its credit risk. Each of these factors should enhance the state bank's profitability.[3]

The case against a state bank begins with the proposition that there are no obvious market failures on the part of private banks in allocating credit and extending loans. While state deposits would create a low-cost source of funds, they come with a hidden cost -- the value of transaction and other services that were being provided by private banks. (However, private discussions with five financial officers in public institutions, private banks, and private businesses did not uncover any substantial benefits flowing from bank deposits held at private banks.) Whether a state bank has superior information that will allow it to enjoy a lower loan default rate remains unproven. Depending on its legal status, a state bank may shift risk to taxpayers. Since many private banks would be larger than any newly established state bank, economies of scale and scope suggest that private banks would have relatively lower operating and borrowing costs.

Moreover, the historical record raises serious concerns for any activities where politicians are in a position to influence lending decisions. Political influence, excessive risk-taking, and "Mission Creep" have adversely affected the performance of state banks. Nonetheless, for state bank opponents, the "elephant in the room" is the state Bank of North Dakota (BND), the only state bank in the United States. It has been in operation for 100+ years, has actively supported small North Dakota banks, and has been very profitable. On the surface, these facts present a strong case for starting a state bank, and the BND is frequently cited as a model for a successful state bank.

In order to gain a better understanding whether the BND is an important exception to the negative historical record and can serve as a model for other states, this paper conducts a case study that compares its profitability and other aspects of financial performance to those of

[3] It is frequently asserted that an additional factor favoring a state bank is the absence of the need for equity capital, an allegedly burdensome cost carried by private banks that a state bank can largely avoid (e.g., Brown, 2013, p. 365; Mettenheim and Butzbach, 2017, p. 40). However, the conclusion that private banks are disadvantaged by having to hold equity capital does not bear-up under closer examination (Chirinko, 2022, Section 3.2).

National Banks. While case studies have received a less than warm reception in some quarters of the finance literature, such an approach is appropriate here in uncovering unique insights into the BND's seemingly superior economic performance (Jensen, Fama, Long, Ruback, Schwert, Smith, and Warner, 1989).

The paper proceeds as follows.

Section II reviews a number of studies of public bank performance and documents the conventional wisdom that state banks are ineffective and inefficient in meeting their stated goals.

Section III provides some background on the BND based on its official history and independent research. Data sources and the BND's relation to the State of North Dakota are discussed, and its abnormal profitability evaluated. Figures 1 and 2 document that the BND's profitability – measured as either the return on assets or the return on equity -- has consistently exceeded those of National Banks by wide margins.

Section IV evaluates the claims made by BND officials as to the sources of their success. Two alleged drivers of BND's profitability are its low cost of funds from deposits received from the State of North Dakota and the BND's lending acuity derived from its knowledge of the North Dakota economy and close associations with borrowers and local bankers. These two propositions are not consistent with the data.

Section V examines three other factors that may contribute to the BND's success. The North Dakota economy has been exceptionally strong during the latter part of the sample period due to the fracking boom that occurred in North Dakota. Being a state agency, the BND does not pay federal or state taxes. Lastly, the BND has been able to shift default risk to taxpayers. Taken together, these three factors account for all of the BND's abnormal profitability. There is no 'secret sauce.'

Section VI concludes that there the BND is a well-run bank that provides financial services to households, firms, and other banks in North Dakota. It makes a normal profit from these activities. It is quick to provide assistance in times of emergencies. But the BND's financial data, appropriately adjusted, do not provide any evidence of special benefits flowing from organizing as a state bank.

Given the evidence in this paper, why are so many states interested in starting a state bank? While further research is required, there is an initial presumption that a primary motivation for creating a state bank is the establishment of a quasi-fiscal authority. Such an

institution allocates funds to pressing economic and social problems outside the direct control of the legislature and the indirect control imposed by balanced budget restrictions in North Dakota and 48 other states. A state bank, as conceived by its supporters, may be more appropriately viewed as a fiscal agent involved with off-budget state expenditures than a bank providing traditional lending services.

II. The Conventional Wisdom About State Banks[4]

This section reviews the literature on the role of government bank ownership and how it adversely affects the performance of state banks through political influence, excessive risk-taking, and "Mission Creep."

In an important and often-cited article, La Porta, Lopez-de-Silanes, and Shleifer (2002) posit two views of government ownership: the development view (DV, e.g., Gerschenkron, 1962) where government involvement solves market failures, attenuates financial frictions, and directs economic resources to social outcomes ignored by private enterprise, and the political view (PV, e.g., Shleifer and Vishny, 1998) where government involvement directs resources to non-economic political objectives. They document the pervasiveness of government bank ownership at the national level across countries and find that greater government ownership is associated with slower subsequent financial system development, economic growth, and productivity growth. Based on alternative measures of bank ownership, Barth, Caprio, and Levine (2001) obtain similar results regarding the performance of financial systems and, in a subsequent study, Barth et al. (2004, p. 245) conclude that "… government ownership of banks is negatively correlated with favorable banking outcomes and positively linked with corruption, …" This empirical evidence largely favors the PV.

Subsequent studies with less aggregate data are also consistent with the PV. In their study of Pakistani firms, Khwaja and Mian (2005) document extensive corruption -- government banks are exclusively responsible for questionable loans to politically connected firms. Illueca, Norden, and Udell (2014) study Spanish savings banks and find a positive relation between regional political influence and ex-ante risk-taking and ex-post loan defaults. In her study of Italian public banks, Sapienza (2004) documents that these banks charge lower interest rates than private banks to firms that are financially similar, and this differential is greater for firms politically connected to the public bank. Moreover, firms that have access to private credit nonetheless borrow from public banks. De Bonis (1998, Table 5) reports lending by Italian public sector banks is seven times greater to all levels of government than by private sector banks and is concentrated in loans to local governments. Japan's Postal System provides an

[4] This section draws, in part, on Chirinko (2022, Sections 4.2 to 4.4).

example of misallocations due to political influence.[5] Prior to the start of the privatization process, funds from the Postal System were deposited with the Ministry of Finance (the national government's treasury department) for distribution through the Ministry's Fiscal Investment and Loan Program, and thus political influence loomed large in allocating capital. Misguided allocations, as well as financial losses, were the primary drivers of its privatization begun in 2007 (Cargill and Yoshino, 2000; Maclachlan, 2011, pp. 180-182).

Several papers quantify the effects of corruption by focusing on electoral cycles, which are usually determined independently of any economic or political considerations. Dinç (2005) reports that public banks increase their lending in election years relative to private banks in his cross-country dataset. Englmaier and Stowasser (2016) provide evidence for German savings banks that are controlled by county-level politicians systematically adjust lending policies in response to local electoral cycles. Using plant-level data for Brazilian manufacturing firms, Carvalho (2014) reports that, just before competitive regional elections, public bank lending expands at favorable terms in politically attractive regions. Cole (2009) documents that lending by public banks in India follows an electoral cycle, increasing in an election year and targeting districts where the election is expected to be close.

On balance, this body of work suggests that political factors unduly influence banks controlled by the government.

Government guarantees of public bank liabilities – either explicit or implicit – are frequently associated with public banks, and they can result in excessive risk-taking. State support creates a classic moral hazard problem, where a public bank feels free to take undue risks because it is backstopped by the financial resources of the state. From 1996-2000, state-owned banks in Thailand had substantially more nonperforming loans than private domestic or foreign banks: 44% vs. 27% and 7%, respectively (Charumilind, Kali, and Wiwattanakantang, 2006, Table 13). Caprio and Martinez Peria (2001) show that, in a sample of 64 countries, public bank ownership tends to increase the likelihood of banking crises, suggesting that these banks take-on more risks as a result of a government guarantee. Gropp, Hakenes, and Schnabel

[5] The Postal System was created in 1875 as a publicly-owned institution and eventually expanded to include banking, insurance, and postal service functions.

(2011) present evidence for OECD countries that government guarantees lead to increased risk-taking only by public banks and conclude that public banks are more likely to expect bailouts.[6]

Public banks are usually created in response to concerns – either genuine or inauthentic -- that important social objectives are not being met by the current financial system.[7] Despite this focus on worthwhile goals, there is a tendency for public banks to suffer, over time, from an expansion of their initial mandate, a phenomenon known as "Mission Creep." Chicago's Shore Bank and the nationwide Freedman's Bank provide classic examples of this unfortunate development. While not a public bank per se, Shore Bank was a mission-driven, community bank that had a major positive impact in the area it served. Its mission was to invest in and revitalize inner-city communities. Founded in 1973, it focused its lending in the South Shore community in the southeastern part of Chicago. The area was in transition from predominantly white to predominantly Black residents and, while income was declining, the community was not in a parlous condition. Despite its social mission and thus occasional extension of credit to high-risk borrowers, ShoreBank was successful and apparently earned a rate of return on its assets comparable to similar financial institutions (Taub, 1988, Table 7.1). This profitability was due in part to depositors attracted to its mission and, in part, to its superior knowledge of the community.

ShoreBank was in business for 35 years and had grown substantially, having assets of $2.6 billion prior to liquidation. There were two reasons for its financial distress (Taub, 2010). The bank had expanded from its original area to undertake similar mission-driven, community banking in Chicago's Westside, rural Arkansas, Cleveland, Detroit, the Upper Peninsula of Michigan, and the Pacific Northwest and with affiliates in 30 countries. The bank expanded beyond its competency. The Great Recession was the second contributing factor. As with most recessions, communities of color are more adversely affected, which had a severely negative

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[6] Although not focusing on public banks, the study by Faccio (2006) of 20,202 publicly-traded firms in 47 countries finds that financially distressed firms that are politically connected are relatively more likely to receive a bailout.

[7] Public banks have a broad social mission, and hence their governing board comprises directors with a wide-range of experiences. This breadth may be problematic. In their study of German public and private banks, Hau and Thum (2009) find that less financial and managerial expertise among board members is linked to poor economic performance during the 2008-2009 financial crisis. For a state bank, there would appear to be an important tradeoff between broad community representation and narrow financial expertise.

effect on ShoreBank's cash flow. Its application for support from the federal Troubled Asset Relief Program (TARP) was denied, and it was liquidated by the FDIC in 2010.

The Freedman's Savings And Trust Company was founded in March 1863 by President Lincoln as an institution where recently emancipated slaves could store their savings with little risk and the opportunity for a modest return.[8] (Slaves were able to accumulate assets from the sale of goods and services while in bondage and from military service in the Civil War.) The Freedman's Bank was initially organized as a savings bank that invested in very safe assets. However, within five years, Mission Creep arose, the Bank's mandate was expanded, and it began to operate as a commercial bank. This fundamental change led to corrupt lending by bank officers and an increase in risk exposure from questionable loans. The latter became particularly problematic during the financial panic of 1873. The Freedman's Bank failed in July 1874 and approximately 41% of the deposits were never recovered by depositors, the overwhelming majority of whom were former slaves.

The deleterious effects of Mission Creep can be compounded for public banks when their deposits are supported by government guarantees. This confluence was particularly evident in Germany, where public savings banks play a very prominent role. They are divided between local savings banks (*sparkassen*, owned by municipalities and counties) and state savings banks (*landesbanken*, owned by the *sparkassen* and the state (*land*) in which the *landesbanken* operates). The mission of the savings banks has changed markedly over time. Originally, it echoed those found in several of the U.S. public banking initiatives:

> The savings banks were originally conceived not as commercial profit-making concerns but rather as state institutions with obligations to provide banking services to less well-off members of the community, to furnish credit on favourable terms to public authorities, and to finance local investment of benefit to the region in which the savings bank was located."
>
> Edwards and Fischer, 1994, p. 103

In recent years, the local savings banks tend to have retail customers, lend to small business, and place their surplus funds with the state savings banks. The latter focus their lending on medium and large firms. The operations of the local savings banks tend to be restricted to the state in

[8] This paragraph draws on the thorough and insightful history of the Freedman's Bank by Edwards (2024).

which they are located. No such restrictions apply to state savings banks, which are the house banks for their own state governments and provide banking services (e.g., payments processing, investment of surplus funds) to the local savings banks in their home regions.

State savings banks (hereafter, state banks) have moved far from their original mission, driven largely by competition over market share with the other two main groups in the German banking system – cooperative banks and commercial banks.[9] In 1969, a market-oriented reform plan was introduced by the president of the national association of savings banks and was enthusiastically endorsed by the Federal Economics Minister. In recent years, the operations of state banks are quite similar to those of private banks and include wholesale banking, securities trading, underwriting, and international business. As a result of a wave of consolidations, there are now only five German state banks, four of which are among the top nine banks in Germany (measured by assets in 2020). They are viewed by some policymakers and commentators as a counterweight to the monopoly power presumably enjoyed by large private banks.

The liabilities and equity of the state banks had been guaranteed by their home state until 2005. Sinn (1999, Sections 3.2 and 3.3) argues forcefully that these guarantees were responsible for their expansion. They clearly had value. In 2005, the guarantees were terminated (based on a 2001 agreement), and the debt ratings of the 10 state banks in existence at that time fell sharply. Fitch reports the following declines in rating notches for [n] state banks: a decline of 4 notches [for 2 state banks], 5 [5], 6 [2], 7 [1] (Körner and Schnabel, 2013, p. 13).[10] In separate calculations, Sinn estimates that the cost of state bank loans is increased by approximately 20 basis points when the debt rating is lowered one notch on a 5-year bond, and increased by approximately 14 basis points for a 10-year bond. Many of the state banks have received financial assistance from their states. As a result of unprofitable real-estate speculation, the State Bank Of Berlin needed a capital injection of €1.7 billion and a loan guarantee of €21.6 billion (Hau and Thum, 2009, Section 2.2). For the period 1991 to 2005, state capital injections into eight state-owned German banks totaled €8.7 billion (IMF, 2006, entry 141 and Table 3). The

[9] Deeg (1999, Chapter 2) and Sinn (1999, Chapter 2 and Appendix 1) describe the historical evolution of state savings banks and other key players in the German banking system.

[10] The impact of this policy change cannot be assessed directly by examining changes in interest rates on state bank bonds (before and after the guarantee was removed) because of anticipation effects. The decision to remove guarantees effective July 18, 2005 was made four years earlier on July 18, 2001. State banks could and did issue bonds during this four-year interval and still enjoyed the benefits of state guarantees for a limited time.

spectacular failure of the West State Bank (the state bank of North Rhine-Westphalia) will cost taxpayers and savings banks €18.8 billion once the disposition of toxic assets and reorganization are completed (Inverardi, 2012, p. 1).

The historical record discussed in this section indicates that political influence, excessive risk-taking, and Mission Creep are ongoing concerns and adversely affect the performance of government-owned banks. There is thus substantial tension between this conventional wisdom of the sub-standard performance of government-owned banks and supra-standard performance of the State Bank of North Dakota. This paper seeks to resolve that tension.

III. Background

A. The State Bank Of North Dakota[11]

The State Bank of North Dakota (BND) was founded in 1919 and, as reported in the *New York Times* (1932), reflected a general agrarian movement that

> … swept the West since the Civil War [1861-1865]. Economics has invariably been at the root of these movements, several of which have resulted in the formation of full-fledged independent political parties. Time after time the dwellers of the prairies have revolted against what they considered the dominant position of the railroads or the moneyed interests of the East, and demanded relief from particular problems.
>
> [The abuses included] … the conditions under which their crops were marketed, the excessive interest rates on farm mortgages, the discrimination in taxation against real estate as compared with personal property, the inadequate representation of the agrarian class in Legislatures, and the exploitation of the farmers by the manufacturers under the patent and tariff laws.
>
> The most remarkable agrarian movement in recent years was the inception and development of the Nonpartisan League, which originated in 1915 in North Dakota …[12] The farmers of North Dakota had shown signs of unrest ten years before the birth of the league, believing themselves the victims of economic grievances.
>
> [The Nonpartisan League captured the North Dakota governorship and both houses of the legislature, and] … [n]othing now stood in the way of putting through the league's program in North Dakota. Among the principal measures which became law during the 1919 session of the Legislature were: Creation of an industrial commission to have control of State-owned financial and commercial industries; operation of State-owned grain warehouses, elevators and flour mills; creation of the Bank of North Dakota; …

[11] This sub-section draws on the Bank of North Dakota (website), Tostlebe (1924), Junker (1989), Kodrzycki and Elmatad (2011), and Jacobs (2018), as well as the two *New York Times* articles cited in this section.

[12] The Nonpartisan League developed in 12 additional states, 11 of which were west of the Mississippi.

The BND is the only state bank currently operating in the United States.[13] Its mission is stated in its enabling legislation:

> *Purpose and establishment of Bank of North Dakota. For the purpose of encouraging and promoting agriculture, commerce, and industry, the state of North Dakota shall engage in the business of banking, and for that purpose shall maintain a system of banking owned, controlled, and operated by it, under the name of the Bank of North Dakota.*
>
> *Bank of North Dakota (website)*

The statement also highlights that distress risk is being borne by the State Of North Dakota, which is "doing business as" the BND.[14] Should the bank become financially distressed, all state resources would be vulnerable for providing financial support, especially since deposits are not insured by the Federal Deposit Insurance Corporation (FDIC). Over the 100+ years that the BND has survived, the only serious challenge to its existence was a recall election in 1921. The governor and two other members of the Nonpartisan League (constituting the Industrial Commission overseeing the BND) were replaced, but the BND itself was not liquidated (*New York Times*, 1921).[15]

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[13] American Samoa (a U.S. territory) has a state/territorial bank, but the island's size and unique location suggest that its experience will not be too instructive for evaluating the possibility of a state bank in one of the 50 U.S. states.

[14] A state bank such as the BND can be organized as part of the state's administrative apparatus, would be "doing business as" (DBA) a bank, and would benefit from the state's financial resources. Alternatively, a state bank can be organized as an entity separate from and owned (in whole or in part) by the state. In this case, the state bank is sometimes referred to as a "government instrumentality;" government sponsored enterprises such as Fannie Mae and Freddie Mac are two prominent examples. The liabilities of a government instrumentality are not backed explicitly by the state government. However, the effective legal and financial liabilities of the sponsoring government are unclear, claims for financial support from distressed creditors are subject to litigation, and a government bailout is always a possibility, as shown in the cases of Fannie Mae and Freddie Mac during the Global Financial Crisis. These organizational structures have different implications for the cost of borrowed funds (which will be lower under the DBA structure) and risk being borne by the state and ultimately its taxpayers. Should a state bank organized as a government instrumentality face financial distress and need to be reorganized or liquidated, taxpayers would lose, at most, the value of their capital investments and deposits. On the other hand, under the DBA structure, all state assets would be jeopardized.

[15] As an aside, it is interesting to note the irony of two very socialist-leaning institutions – the BND and the State-owned grain warehouses, elevators and flour mills created in 1919 – being permitted to continue operations in the very politically conservative state of North Dakota. From 2000 to 2024, the spread of votes in the Presidential elections between the Republican and Democratic candidates averaged 27.0%.

A very important component in the enabling legislation was that the Bank had a very substantial and inexpensive source of funds:

> *All state funds and funds of all state penal, educational, and industrial institutions must be deposited in the Bank of North Dakota by the persons having control of such funds or must be deposited in accordance with constitutional and statutory provisions. All income earned by the Bank for its own account on state moneys that are deposited in or invested with the Bank to the credit of the state must be credited to and become a part of the revenues and income of the Bank.*
>
> *Bank of North Dakota (website)*

The redirection of state funds to the BND away from private banks created tensions with the private banking community. To attenuate concerns, the BND initially redeposited all funds back into the local banks from which they were transferred, has maintained only one office located in the state capital (Bismarck), currently has small satellite lending offices in only three North Dakota cities, and does not actively solicit retail deposits.

The other key element of success is the lending policy, which has changed focus over time: 1930's, farms and municipalities; 1940's and 1950's, residential mortgages and North Dakota municipal securities; 1960's onward, economic development, commercial loans and, until 2010, student loans. The BND does not originate most loans (student loans are the major exception). Rather it partners with North Dakota banks, serving as a "bankers' bank." This partnership arrangement is an important element that relies on the profit-incentives of private banks to attenuate the role of political influence in allocating capital. The BND's major role is more as a supplier of capital rather than a lead lender finding lending opportunities based on its knowledge of local conditions. It supports local banks with participation loans and access to the Federal Funds market and the discount window.

One reason for the continued existence of the BND is its outsized profitability. However, as will be documented in Section V, a large share of this profitability is driven by implicit taxpayer subsidies, a fact that may not be fully appreciated by the conservative North Dakota electorate.

B. Profitability

The analysis is based on financial statement data taken from the annual reports for the years 1991 to 2022 provided by the Bank of North Dakota and the Federal Financial Institutions Examination Council (FFIEC). The latter publication contains data for National Banks (NAT), which is chosen as the comparison group because the BND's participation lending is spread across banks of all sizes.[16] Section V relies on data for all state-chartered banks (STC) and North Dakota state-charted banks (NDS). The former data are obtained from the FFIEC; the latter data from the North Dakota Department of Financial Institutions, State Banking Board, and State Credit Union Board.

Tables 1 and 2 contain data on profitability for BND and NAT, as well as the gap between the two labeled the BND Premium and, for a given item, present the mean of ratios, the standard deviation, the coefficient of variation and, when relevant, p-values for the null hypothesis of the equality of the "Mean Of Ratios" for BND to the "Mean Of Ratios" for NAT, multiplied by 100. Statistics are presented for four periods: 1991-2022 (the benchmark sample), 1991-2007 (split sample, early), 2008-2022 (split sample, late), and 1981-2022 (max sample). Table 1 presents the returns on assets (ROA's computed as net income divided by total assets) and documents a large BND Premium, the gap between ROA^{BND} (1.79%) and its comparison group, ROA^{NAT} (1.04%). The means for these two ROA's differ by 74 basis points. The null hypothesis of the equality of the mean ROA^{NAT} to the mean ROA^{BND} is evaluated with a t-test; unsurprisingly, the associated p-values indicate that the null is strongly rejected. Moreover, for the celebrated JPMorgan Chase, its ROA of 0.97% (for 2005 to 2022, excluding 2008) is much lower than the comparable ROA^{BND} of 1.73%.[17] Lastly, the coefficient of variation indicates that NAT profitability is much more volatile than that for the BND.

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[16] While the size distribution of U.S. banks is heavily skewed rightward, the ROA's for very large banks do not differ from that for all National Banks. For the period 2015-2022, the average ROA for the five largest banks (JPMorgan Chase, Bank of America, Citibank, Wells Fargo, and U.S. Bancorp) is 1.01, slightly lower than the comparable ROA for National Banks of 1.05.

[17] The sample period is truncated relative to the benchmark because the major merger of JPMorgan Chase and Bank One occurred on July 1, 2004. Data for 2008 are excluded because of financial statement adjustments due to JPMorgan Chase's acquisitions of Washington Mutual, which resulted in negative goodwill and a substantial increase in net income, and Bear Stearns, which resulted in a substantial decrease in net income (JPMorgan Chase & Co., 2008, pp. 9-11 and p. 38). If 2008 is included, $ROA^{JPMORGANCHASE}$ falls slightly from 0.97% to 0.93%.

Very similar results are obtained for the returns on equity (ROE's, computed as net income divided by book equity) presented in Table 2. A BND Premium of 862 basis points exists between ROE^{BND} (19.97%) and ROE^{NAT} (11.36%).[18] Since the ROE's could be affected by different regulations determining the amount of equity private national banks must hold, ROA would seem to be a more reliable measure of profitability. However, the very similar results in Tables 1 and 2 suggest that regulatory differences are of modest importance for ROE in this instance.

Time series for the ROA and ROE data are presented in Figures 1 and 2, respectively, for BND and NAT. BND profitability uniformly exceeds that of NAT (with the exception of ROE in 1993). The gap is particularly stark during 2008 and 2009, reflecting NAT's much greater participation in compromised derivative markets.

As an aside, we investigate in three dimensions the extent to which conclusions about the relative profitability of BND vs. NAT are sensitive to measurement. First, profitability is defined as a ratio of net income to either the stock of assets or equity. There does not appear to be any criteria for computing the average effect as the mean of ratios, which is the procedure used to compute the statistics discussed above, or the ratio of means of the numerator and denominator, where these means are computed separately over the sample period. The difference between the two statistics is driven by the variation in assets or equity appearing in the denominator.[19] The ratio of means statistics are reported at the bottom of each panel in Tables 1 and 2 and indicate that differences between the two computation methods are unimportant. Column 3 in panel A of either table shows that the BND Premium does not vary for ROA and

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[18] Comparable calculations for ROE for the truncated JPMorgan Chase sample (cf. fn. 17) are ROE^{BND} (18.89%) and $ROE^{JPMORGANCHASE}$ (11.47%).

[19] The difference between the two statistics is determined by the weights implicitly used in computing profitability (Rao, 2002). In general, $\pi^{General} = \sum_{t=1}^{T} \omega_t \left(n_t / d_t \right)$, where profitability is defined by the following components: ω_t is a weight, n_t is the numerator, and d_t is the denominator. If $\omega_t = \left(1/T\right)$, then $\pi^{General} = \pi^{Mean\,Of\,Ratios}$; if $\omega_t = d_t / \sum_{t=1}^{T} d_t$, then $\pi^{General} = \pi^{Ratio\,Of\,Means}$. If $d_t = d \;\; \forall t$, then $\pi^{Mean\,Of\,Ratios} = \pi^{Ratio\,of\,Means}$. This general equation for profitability highlights that the variation in the denominator drives the difference between $\pi^{Mean\,Of\,Ratios}$ and $\pi^{Ratio\,Of\,Means}$ and, if d_t trends upward over time, $\pi^{Ratio\,Of\,Means}$ gives greater weight to more recent observations.

differs by only -3.5% (= (8.32% - 8.62%) / 8.62%) for ROE in Table 2. The remainder of the paper will be based on the mean of ratios, which has the advantage of permitting the computation of t-statistics and p-values for the null hypothesis of the equality of means.

Second, we examine the sensitivity of the results over the 32-year sample period by splitting the sample between 2007 and 2008. This date is chosen because it nearly halves the sample and reflects an accounting change (indicated by a vertical BREAK line in Figures 1 and 2). From 2008 onward, both the NAT and BND data are based on a fiscal year ending on December 31st. However, prior to 2008, the NAT data are based on a fiscal year ending on June 30th. As shown in column 3, panels B and C, Table 1, the BND Premia for ROA remain substantial; 0.70 for the Early period and 0.80 for the Late period. These BND Premia represent 60% and 88% of NAT profitability for the Early and Late periods, respectively. Comparable percentage differences for ROE are 55% and 114% for the Early and Late periods, respectively.

Third, 1991 is the beginning of our benchmark sample because of an availability constraint on data for banks chartered by the state of North Dakota (NDS) used in Section V.A to adjust for North Dakota's robust growth in the Late period. However, profitability data for BND and NAT are available for an additional 10 years, and ROA statistics for this maximum sample are reported in panel D in Table 1. The BND Premia for the maximum and benchmark samples are 0.72% and 0.74%, respectively. Similarly small differences in BND Premia for ROE are evident in panel D of Table 2: 8.43% and 8.62%.

By any measure, BND profitability has been dramatically larger than the comparable profitability for national banks.

IV. Two Alleged Reasons For The State Bank Of North Dakota's Abnormal Profitability

Two propositions have been advanced to explain the BND's abnormal profitability. Each is evaluated in turn in the next two sub-sections.

A. Low-Cost State Deposits

According to the BND's president, one of the two key elements to the Bank's success is

> *Our funding model, our deposit model is really what is unique as the engine that drives that bank. And that is we are the depository for all state tax collections and fees. And so we have a captive deposit base, we pay a competitive rate to the state treasurer.*
>
> Harkinson, 2009, p. 4

The proposition that state deposits are an important factor responsible for the BND's abnormal profitability is evaluated in Table 3. If low funding costs from deposits are a driver of BND's success relative to NAT, then we would expect the BND to hold relatively more deposits and have relatively lower interest expense. Neither proposition is supported by the data. As shown in panels A and B, Deposits/Assets and Deposits/Liabilities ratios are generally lower for the BND, though the results differ by sample period. In the Early period for either panel, the ratios are about 800 basis points lower for the BND. In the Late period for either period, the ratios are approximately equal. Both results are consistent with the p-values. Moreover, BND's deposits (panel C) are slightly more expensive than for NAT, though the differences are not statistically significant. The low-cost-deposit channel is not supported by the data.

B. Lending Acuity

The second proposition advanced by former BND president, Eric Hardmeyer, is that BND lending is especially successful in identifying good credit risks:

> *[the credit crisis] … just reinforced what we do, and that is you stick to what you understand, you do it well, you know your customers.*
>
> *Harkinson, 2009, p. 16*

The value of being close to borrowers is not clear. Cole, Goldberg, and White (2004, p. 228) report that "lending decisions of large banks, but not of small banks, are more likely to be a function of financial variables, whereas the lending decisions of small banks, but not large banks, are more likely to be a function of variables indicating pre-existing relationships between the bank and loan applicant." Confirmatory survey evidence is provided by Whiteman (1998). By contrast, Petersen and Rajan (2002, p. 2535) find that "technology is slowly breaking the tyranny of distance, at least in small business lending" by allowing hard information (e.g., financial variables) to be evaluated more quickly and accurately.

Data in Table 4 allow for an examination of the lending acuity hypothesis. (The discussion in this section is restricted to the results for the Benchmark Sample in column 1; the results are very similar across the other three samples.) Panel A presents data for gross loan income/loans, and the BND's mean of 5.45% is much lower than NAT's mean of 6.37%. This difference (whose significance is confirmed by the p-value) could reflect poor performance, conservative lending, or a social mission, where, in the latter case, the BND directs resources to projects with high social but low pecuniary returns.

The social mission hypothesis is not tenable for three reasons. First, lending to support social missions is likely to be riskier and, as presented in panel B, the BND's provision for loan losses (per loan) of 0.22% is much lower than NAT's of 0.93%. Second, most BND loans are joint with commercial banks who are unlikely to be willing to sacrifice profitability for the social good. Lastly, the former BND president affirms that the BND does not actively pursue a social mission aimed at economic development:

> If you are going to have a state-owned bank, you have to staff it with bankers. If you staff it with economic developers you are going to have a very short-lived, very expensive experiment. Economic developers have never seen a deal they didn't like. We deal with that every day.
>
> *American Banker* (2011)

Panel C shows that the BND and NAT earn nearly the same net income from loans -- 5.23% vs. 5.43%, respectively. This result suggests that loan selection by the BND earns a normal return. If lending decisions were inferior, we would expect BND net loan income to be less than that for NAT. Instead, the performances of the loan portfolios are approximately equal.

The data in Table 4 are consistent with a conservative lending strategy in which the BND chooses less risky loans, earns lower returns, and suffers lower loan losses. By contrast, NAT chooses riskier loans, earns higher returns, and suffers larger loan losses. Net loan profit margins, which adjust for interest expenses, are nearly identical: 3.39% for BND vs. 3.45% for NAT (panel D).[20] Lending clearly does not raise BND's relative profitability. Table 4 documents the absence of lending acuity by the BND.

The "secret sauce," if it exists, lies elsewhere.

[20] See the note to Table 4 for details of the computation of the Net Loan Profit Margin.

V. The 'Secret Sauce'?

This section evaluates three possible reasons for the BND's impressive performance unrelated to specific benefits flowing from its status as a state bank: the robust growth in the North Dakota economy, the favorable tax status enjoyed by the BND, and the shifting of risk to the State of North Dakota.

A. North Dakota Economic Growth

1. *Results*

Has the BND stimulated economic activity in North Dakota? The statewide stimulus hypothesis can be evaluated with real GDP data for North Dakota normalized by controls drawn from neighboring states. Results are presented for real GDP growth rates in Table 5 for the full sample period, 1998-2022, which is a bit shorter than the sample period used in the prior tables owing to data availability. The North Dakota growth rates are normalized by subtracting the growth rate of a control group: 1) the three states that border North Dakota (Minnesota, Montana, and South Dakota) or 2) these three states plus Wyoming, which nearly borders North Dakota. (Apart from geographical proximity, North Dakota and the four control states are similar in having very high levels of social capital; Alesina and La Ferrara (2000, p. 848) categorize them as five of the nine states with the highest levels of social capital.) As shown in panel A for the Bordering States, the normalized North Dakota growth rates during the sample period were higher by between 1.21% (unweighted) and 1.46% (weighted by state size). (The unweighted statistic is preferred because of Minnesota's dominant influence; its GDP is approximately 2.5 times larger (over the sample period) than the combined GDP for the other three control states.) Somewhat greater differences are reported when the control group is expanded to include Wyoming. These results suggest the possibility that the BND may be providing some uniquely beneficial services to the North Dakota economy.

That tentative conclusion does not survive further analysis. Columns 2 and 3 present the results for the sample split in 2007 and 2008. For the first part of the split sample, the unweighted results document that the normalized North Dakota growth rate is slightly above (0.03%) or below (-0.44%) zero, suggesting little positive impact of the BND. However, for the second part the sample, the North Dakota economy performs much better, exceeding the control groups by between 1.64% and 2.25%. This latter robust growth is responsible for North

Dakota's overall favorable performance reported in the above paragraph, and it is largely driven by the expansion in fracking to extract oil and gas and the associated economic stimulus. The average price of crude oil doubled, from $30.75 to $72.56 per barrel, between the first and second parts of the sample. For the same period, North Dakota had the greatest increase in expenditures for oil and gas extraction, 2,171%, relative to increases of 160%, 32%, and 65% for the 3-state control group, the 4-state control group, and the United States, respectively.[21] Pennsylvania is the state with the next largest increase (1,113%), and it too was heavily involved with fracking.[22] The superior performance of the North Dakota economy over the full sample is traced to developments in the latter part of the sample, most importantly the fracking boom, not to unique services provided by the BND over the entire sample. This conclusion is consistent with a statement from former BND president Hardmeyer:

> *but Hardmeyer says the bank isn't responsible for the prosperity. "We are a catalyst, perhaps, or maybe a part of it," he said. "To put this at our feet is flattering, but it frankly isn't true."*

The absence of abnormally positive growth in the North Dakota economy in the first part of the sample, the fracking boom in the second part of the sample, and anecdotal evidence suggest little support for the proposition that the BND provides a stimulus affecting statewide GDP.

To properly evaluate the profitability of the state bank organizational structure, we must control for fracking-related economic growth that is independent of the BND and that may nonetheless affect its profitability. The Adjusted BND is computed for each year in the later part of the sample period by defining a North Dakota premium -- subtracting the pre-tax profitability of all banks chartered by all states ($\tilde{\pi}^{STC}$) from the pre-tax profitability of all banks chartered by

[21] Minnesota registered the greatest percentage increase. However, this large number is driven by Minnesota's expenditures for oil and gas extraction that were less than $1 million in the early sample, compared to $126 million and $323 million for North Dakota and Pennsylvania, respectively.

[22] The oil price data are from FRED-OIL (website); the GDP and oil and gas extraction data are from the BEA (website).

the state of North Dakota ($\tilde{\pi}^{NDS}$) -- and then subtracting this North Dakota premium from reported BND profitability:[23]

$$\begin{aligned} \pi^{BND}_{Adjusted} &= \pi^{BND}_{Reported} - \text{ND PREMIUM}, \\ &= \pi^{BND}_{Reported} - (\tilde{\pi}^{NDS} - \tilde{\pi}^{STC}). \end{aligned} \tag{1}$$

Using NDS banks to isolate the effects of the "fracking treatment" is appropriate because, as noted above, the BND partners with local North Dakota banks when extending loans. This procedure also meets two key identifying assumptions. The mean profitability is nearly the same for the NDS and STC banks in the pre-fracking period, defined here as the Early period (i.e., in a sense, the parallel trends assumption is satisfied); the means are 1.52 and 1.59 for the pre-tax profitability of NDS and STC, respectively. Additionally, the fracking treatment is exogenous to bank activity, and thus the orthogonality assumption is satisfied. The ND-growth adjustment factor lowers BND profitability, and these adjustments are subtracted from the profitability data in Tables 1 and 2. As reported in the first column of Table 6, the ND-growth-adjusted ROA and ROE are 1.65% and 17.84%, respectively.

The empirical work is focused on the BND Premium – the gap between BND profitability (π^{BND}) and NAT profitability (π^{NAT}) – equal to 0.74% (ROA) or 8.62% (ROE) (Tables 1 and 2, column 3; Table 6, column 7), and thus it is useful to gauge the extent to which a profitability adjustment reduces these gaps with the following Z-statistic,

$$Z = \frac{\pi^{BND}_{Reported} - \pi^{BND}_{Adjusted}}{\pi^{BND}_{Reported} - \pi^{NAT}_{Reported}} * 100, \tag{2}$$

where "reported" denotes the data and "adjusted" the modification for North Dakota growth (and the other two factors considered in this section). The denominator is the profitability difference

[23] Adjusting net income for taxation and basing the calculations on gross income is important because the tax rate for STC is greater than that for NDS. The average tax rates are 30.0% and 21.9%, respectively. This taxation adjustment has a greater impact on raising the profitability of STC (i.e., 1/(1-0.300) > 1/(1-0.219)) and thus lowers the impact of the ND-growth adjustment.

between BND and NAT to be explained; the numerator is the profitability difference explained by a given adjustment. (In a loose sense, the Z-statistic is a goodness-of-fit statistic measuring the explanatory power of an adjustment.) The Z-statistics (Table 6, column 1; Figures 3 and 4) are 18% and 25% for ROA and ROE, respectively, when the effect of the robust North Dakota economy is removed from BND profitability.

2. Possible Biases From BND Interventions

Even if North Dakota's economic growth is not affected appreciably by the BND, it is possible that the presence of a state bank affects local bank profitability through interventions in loan markets and thus may distort the North Dakota economic growth adjustment. The BND participates in private loan markets in two ways: lowering the cost of borrowed funds and underwriting some loans. BND participation creates the possibility of a systematic upward bias (BIAS > 0) in the NDS profitability data and the ND PREMIUM, and hence a downward bias in $\pi^{BND}_{Adjusted}$ in Section IV.A.1 that would make it more difficult to find the 'Secret Sauce' (i.e., an upward bias in the Z statistic),

$$\begin{aligned} \pi^{BND}_{Adjusted} &= \pi^{BND}_{Reported} - \text{ND PREMIUM} \\ &= \pi^{BND}_{Reported} - (\pi^{NDS} * (1+\text{BIAS}) - \pi^{STC}). \end{aligned} \tag{3}$$

To understand the nature of the BIAS, we analyze a formal theoretical model presented in Appendix A. A local NDS bank earns revenues from loans and other income-earning assets, incurs fixed costs, and obtains finance from deposits and borrowings. The latter are more expensive and are the marginal source of funds. Additionally, the local bank exerts market power when extending loans, an assumption consistent with the small and widely-dispersed banks that constitute the North Dakota banking sector. BND participation lowers the NDS' cost of borrowed funds. For loans supported by borrowed funds, the decline in borrowing costs is less than the decline in revenues because of the constant markup. For loans supported by deposits, borrowing costs do not change but revenues decline. In both cases, average profitability, measured as ROE or ROA, falls as a result of BND participation, and BIAS $\leq$ 0. Rather than overstating the ND-Growth adjustment (i.e., BIAS > 0), the impact of the lower-borrowing-cost channel on NDS profitability understates the ND-Growth adjustment.

A second way in which the BND participates in local loan markets is underwriting some loans and transferring them to its balance sheet. (This transfer has no effect on revenue per loan; the amount of loans issued does not change, just ownership from the NDS to the BND.) This form of BND loan participation also has a negative effect on the NDS' ROE, as the local North Dakota bank loses a profitable investment opportunity, and BIAS < 0. For profitability measured by ROA, BND participation has two effects. Apart from removing a profitable loan from the local bank and lowering its ROA, the BND transfer results in a rise in profits per remaining assets for the local bank, and hence a rise in its ROA. In a model with one asset and one source of funds, BIAS < 0 but, in a more general model with many assets and funding sources, the sign of BIAS is indeterminate analytically. The sign is negative if the marginal profitability from lending (evaluated as an absolute value) is greater than average profitability (i.e., ROA). Since lending is likely the most profitable activity taken by a bank, marginal profitability from lending is expected to exceed the ROA based on all bank assets. That expectation is confirmed empirically. Based on sample means for NDS during the latter period, marginal profitability (2.70) exceeds average profitability (1.18).

BND participation in local lending markets, either by lowering borrowing costs or underwriting loans, leads to a negative bias (cf. equation (3)) and hence does not prejudice the adjustments made in this section against finding the "secret sauce."

B. Tax-Free Status

Owing to its status as a state institution, the BND is exempt from paying a variety of taxes. Three are examined here. For-profit institutions such as commercial banks are subject to property taxation. Even if property taxes were assessed against the BND, they would have little impact on its profitability because it owns only one main office building.

Sales taxes in North Dakota are a combination of state sales taxes of 5% (constant from 1989 to the present) and local sales taxes that cannot exceed 3%.[24] We assume an upper bound estimate of North Dakota sales taxes of 8%. Three expense items from the income statement – data processing, occupancy and equipment, and other operating expenses – are multiplied by 8%, and this figure is subtracted from profitability. The effects on ROE and ROA are trivial,

[24] North Dakota Office of State Tax Commissioner (2022, p. 84) and (n.d.).

lowering both returns by less than one percent. Some municipalities levy sales taxes, though these are unlikely to add appreciably to the adjustments. Exemptions from property and sales taxes have little effect on BND profitability, and hence they are not responsible for its abnormally high level.

However, the BND exemption from federal and state income taxes has a major impact on profitability. The income tax rate paid by NAT averaged 29.3%. This rate (in combination with the sales tax adjustment) is used to lower reported profitability. The adjusted ROA^{BND} is 1.25%, which closes the gap between BND and NAT by 73% (Table 6, column 2). The impact of income taxes is similar for ROE^{BND}; the gap closes by 71%.

C. Risk-Shifting

North Dakota taxpayers are responsible for the debts incurred by the BND because, as noted in Section III and fn. 13, the State Of North Dakota is "doing business as" the BND. The BND is not a member of the FDIC, and thus default risk is being borne by the State of North Dakota. This arrangement effectively shifts the potential cost of default to the taxpayers of North Dakota and lowers operating costs for the BND. In order to properly compute the BND's profitability, we value this risk by computing the insurance premiums the BND would have paid to the FDIC if it was a participating institution. The insurance premiums are primarily focused on deposits, and the value of the risk shifted to the State of North Dakota is computed as the product of the FDIC's annual effective assessment rates (FDIC, 2024, pp. 184-185) and the annual amount of BND deposits. The average of this insurance premium is 2.8% of net income. When deducted from BND income, ROA falls from its reported value of 1.79 to 1.74 (Table 6, column 3). Comparable calculations for ROE are 19.97 to 19.44. The gap between BND and NAT profitability would be closed by 6% for ROA and ROE.

There are other elements of risk-shifting not captured in the reported calculations. While the BND and NAT carry nearly the same amount of loans on their balance sheets (58% and 57%, respectively), the BND has a larger proportion of higher risk commercial & industrial loans than NAT, 22% vs 14%, respectively. Deposits are generally viewed as a low-cost, stable source of finance, and they are more volatile for the BND. Coefficients of variation for deposit/assets and deposit/liabilities ratios are both 0.13 for the BND, relative to 0.08 for the NAT.

The risks discussed in the above two paragraphs could be offset if the BND has substantial cash reserves. Table 7, panel A shows that this seems to be the case both economically and statically, as the BND's cash/assets ratio is 10.75%, much larger than the NAT's comparable ratio of 7.06%. However, those figures are misleading because they do not reflect the amount of Federal Funds bought and sold. Both the BND and the NAT tend to be net buyers of Federal Funds (Table 7, panel D). Given these imbalances, a more appropriate measure of liquid assets is net cash, defined as cash plus Federal Funds sold less Federal Funds bought. As shown in Table 7, panel E, column 1, net cash to total assets is approximately the same for the BND (5.44%) and the NAT (5.87%). These figures are for the full sample, and the results differ over the sub-samples. During the Early period, the BND holds relatively more net cash than the NAT (3.86% vs. 2.75%), but this relation is reversed during the Late period (7.22% vs. 9.41%).

The BND takes on much more risk than comparable banks by tilting the loan portfolio to risky commercial & industrial loans, holding volatile deposits and, in recent years, holding relatively little cash.[25] The commensurate default risks are shifted to North Dakota taxpayers and are costs that should lower BND adjusted profitability beyond the quantitative estimates presented in this sub-section.

D. Three Adjustments Combined

The combined effect of the three adjustments is measured by their sum and is presented in Table 6, column 4 and Figures 3 & 4. When BND reported profitability is adjusted by the total effect, it is very close to NAT reported profitability. For ROA and ROE, the Z-statistics are 97% and 102%, respectively.

For a state bank, there is no 'secret sauce.'

[25] Actual risk exposure is complicated to assess, as several of the bank's assets, such as some student and agricultural loans, are guaranteed by the federal government or other parties.

VI. Conclusions

Understanding the BND and its abnormally positive profitability is important for informing ongoing discussions about the advisability of starting a state bank. Its purported successes play a pivotal supportive role in that debate. Two of the explanations advanced by the BND – low-cost state deposits and lending acuity -- are rejected by the data. Rather, as summarized in Figure 3 and 4 and Table 6, the BND's success is due, in part, to its exemption from income taxation and, in part, to shifting risk to the North Dakota taxpayers. In addition to these state subsidies, the third and final factor has been the fracking-stimulated robustness of the North Dakota economy, a factor that cannot be transferred to other states. In the end, there is no "secret sauce" associated with the BND. Moreover, there is no evidence that its profitability is lowered by lending to projects with high social returns but sub-par pecuniary returns. The BND is a well-run bank that provides financial services to households, firms, and other banks of North Dakota. In times of crisis, it quickly provides financial assistance to North Dakota households and firms. It makes a normal profit from these activities. But, properly adjusted, the BND's performance does not provide support for any special benefits from organizing as a state bank.

Absent efficiency gains, what might be the motivation for the recent interest in a state bank?[26] An examination of the proposed legislation from New York (at the beginning of this paper) and other states reveals that state banks are being created to focus on several goals (bullet points below contain quotations taken from legislation proposed in several states):

- "improving public infrastructure and increasing access to higher education,"
- "addressing social issues,"
- "supporting various groups (cities and towns, small and medium enterprises especially in underserved communities, rural business, state-chartered banks, worker-owned coops, women-owned enterprises),"
- "stabilizing the state's economy,"
- "providing local businesses improved access to credit,"
- "augmenting the lending capacity of community banks,"
- lending "to instrumentalities" of a State,
- funding "governmental operations with a portion of the bank's earnings."

[26] Some proposals mention that a state bank is needed to provide transactions services to underserved communities. See Chirinko (2022, Section II) for further discussion and the potential for technology to attenuate this problem. It is interesting to note that a new financial institution with the goal of aiding an underserved community in Chicago plans to begin operating by offering services online, as well as at several temporary bricks-and-mortar locations (Chicago Sun-Times, 2022).

Many of these goals of the proposed state banks overlap with the spending programs supported by appropriations from state legislatures. They could be addressed by empowering and funding extant state government agencies. Moreover, the governing boards for many of the proposed state banks contain a large number of government officials. The BND's governing board (The Industrial Commission) is comprised of the governor, agriculture commissioner, and the attorney general, and its advisory board is comprised of seven members, all appointed by the Governor. Political pressures confront the BND. It routinely receives orders from the North Dakota legislature to extend loans to certain groups and institutions. For the biennium beginning July 1, 2021 and ending June 30, 2023, there were 31 directives authorizing $2.25 million in transfers (see Appendix B for the list of directives). In most cases, actual cash transfers were less than authorizations and totaled $0.98 million. The largest authorization and transfer were $680,000 and $384,558, respectively for infrastructure projects. Fortunately, the cumulative impact of these directives was very modest relative to the state budget and BND's financial position. It is not clear how politicians have been kept at bay in North Dakota.[27] Nonetheless, they offer a reminder that legislative interference is an ongoing concern for any state bank.

There is a preliminary presumption that a primary motivation for creating state banks is the establishment of a quasi-fiscal authority that allocates funds to pressing economic and social problems outside the direct control of the legislature and the indirect control imposed by balanced budget restrictions in North Dakota and 48 other states. It is worth noting that the eight states proposing a state bank (as well as California, which passed legislation authorizing municipal banks), tend to be Democratic "blue" states that generally favor an active role for government.[28] A state bank, as currently conceived by its supporters, may be more appropriately viewed as a fiscal agent involved with off-budget state expenditures than a bank providing lending and transactions services.

While the BND is the only state bank operating currently (cf. fn. 13), seven states owned and operated state banks – Alabama, Georgia, Illinois, Kentucky, South Carolina, Tennessee, and

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[27] The largest scandal during the BND's 100^{+}-year history occurred from 1983 to 1988 regarding a deal to sell North Dakota seed potatoes to Honduran growers (Jacobs, 2018, pages 83-84).

[28] In the 2020 presidential election, all eight states listed in fn. 1 plus California favored the Democratic candidate. In 2024, the number was reduced to seven states, as Arizona and Wisconsin favored the Republican candidate.

Vermont – during the Antebellum period (1812-1865). They are currently being evaluated in Chirinko (in process) to obtain further insight into the factors driving the successes (at least one state bank appears to have been quite profitable) and failures of state banks.

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Appendix A: Declining Profitability Of North Dakota Private Banks After A Bank Of North Dakota Intervention

This appendix evaluates formally the implication of the BND's participation in local lending on the average profitability of North Dakota private banks, as measured by ROA and ROE. Participation lending by the BND may occur in one of two ways: lowering the cost of borrowed funds to the participating bank (examined in sub-section A) or underwriting some private bank loans and transferring them to its balance sheet (sub-section B). The results for both forms of participation lending for ROA and ROE are summarized in a table at the end of this appendix. In three of the four cases, the analytic models document that participation lending by the BND results in a fall in profitability; in the fourth case, the result is ambiguous, though intuition and data suggest that profitability falls in this case too. The implications of these results for the adjustment for North Dakota's abnormally high growth in the Late period are discussed in Section V.A.2.

A. Lowering The Cost Of Borrowed Funds

We begin with a simple model of a North Dakota private bank where the only source of debt finance is borrowed funds (D^B), all loans (L) are financed by borrowed funds ($L = D^B$), and financing costs are constant (R). We assume that the local NDS bank has market power when extending loans, an assumption consistent with the small and widely-dispersed banks that constitute the North Dakota banking sector. The price of loans (P^L) is a constant elasticity (γ) function of loans, and profits (π) are defined as follows,

$$\begin{aligned} \pi &= \text{Loan Revenues - Financing Costs} \\ &= P^L \bullet L - R \bullet L, \\ &= L^{-\gamma} \bullet L - R \bullet L. \end{aligned} \tag{A-1}$$

Profit maximization with respect to loans implies the well-known equality between price and markup-adjusted marginal cost,

$$P^L = \left(L^*\right)^{-\gamma} = R/(1-\gamma) = \mu \bullet R, \tag{A-2}$$

where the markup, $\mu \equiv (1/(1-\gamma)) > 1$. Defining the profit maximizing ROA* as (π^*/L^*), substituting equation (A-2) into (A-1), dividing both sides by L*, and differentiating with respect to R, we obtain,

$$\frac{dROA^*}{dR} = \mu - 1 > 0. \qquad \text{(A-3)}$$

When the BND participates with local North Dakota banks by lowering financing costs, ROA* falls.

The above derivation does not recognize that the firm has multiple income-earning assets (securities (S) and cash (C)), another source of debt finance (deposits, D^D), and fixed costs. The flows associated with these components define Ω as the income from securities and cash less interest on deposits and fixed costs. In this expanded model, loans are divided between those financed by deposits (L^D) and borrowed funds (L^B), and profits are written as follows,

$$\pi = \left(L^B + L^D\right)^{-\gamma} \bullet \left(L^B + L^D\right) - R \bullet L^B + \Omega. \qquad \text{(A-4)}$$

Since borrowed funds are more expensive than deposits, they are the marginal source of finance and are included as a separate term in equation (A-4). Differentiating with respect to L^B, we obtain a first-order condition similar to equation (A-2),

$$P^L = \left(L^B + L^D\right)^{-\gamma} = \mu \bullet R. \qquad \text{(A-5)}$$

Defining the profit maximizing ROA** in a multiple asset model as $(\pi^{**}/(L^{B^{**}} + L^D + S + C))$, dividing both sides of equation (A-4) by $(L^{B^{**}} + L^D + S + C)$, substituting equation (A-5) into (A-4), and differentiating with respect to R, we obtain,

$$\frac{dROA^{**}}{dR} = (\mu - 1) * \omega^{B} + \mu * \omega^{D} > 0, \qquad \text{(A-6)}$$

$$\omega^{B} \equiv \frac{L^{B^{**}}}{(L^{B^{**}} + L^{D} + S + C)},$$

$$\omega^{D} \equiv \frac{L^{D}}{(L^{B^{**}} + L^{D} + S + C)}.$$

The BND's participation lowers the NDS' cost of borrowed funds ($dR < 0$) and has two effects on profitability. For loans supported by borrowed funds, the decline in borrowing costs is less than the decline in revenues because of the constant markup (as shown in the first term in equation (A-6)). For loans supported by deposits, borrowing costs do not change but revenues decline, thus lowering average profitability (as shown in the second term in equation (A-6)). Average profitability for NDS banks, measured by ROA, falls as a result of BND participation.

Equation (A-6) is a generalization of the simple model with only one asset and one source of funds. If $L^{D} = S = C = 0$, equation (A-6) reduces to equation (A-3).

The above procedure can be used to analyze the response of ROE to R by defining ROE** in a multiple asset model as $(\pi^{**}/(L^{B^{**}} + L^{D} + S + C - D^{B} - D^{D}))$, where the denominator is the book value of equity. The derivative for ROE** comparable to equation (A-6) is as follows:

$$\frac{dROE^{**}}{dR} = (\mu - 1) * \upsilon^{B} + \mu * \upsilon^{D} > 0,$$

$$\upsilon^{B} \equiv \frac{L^{B^{**}}}{(L^{B^{**}} + L^{D} + S + C - D^{B} - D^{D})}, \qquad \text{(A-7)}$$

$$\upsilon^{D} \equiv \frac{L^{D}}{(L^{B^{**}} + L^{D} + S + C - D^{B} - D^{D})}.$$

Equations (A-6) and (A-7) confirm that decreases in R due to BND intervention lowers local bank profitability measured by either ROA or ROE. The BIAS term in equation (2) is negative.

B. Underwriting Some Private Bank Loans

An alternative way in which the BND can participate in the loan market and assist private North Dakota banks is by underwriting part of the loan originations. Modeling the effect of BND underwriting on profitability involves a two-step process: 1) the private bank chooses the optimal amount of loans and then 2) the BND buys θ of these loans with cash that, in turn, is used to reduce borrowed debt. Profits are written by modifying equation (4) as follows,

$$\pi = \left(L^B + L^D\right)^{-\gamma} \bullet \left(L^B - \theta + L^D\right) - R \bullet (L^B - \theta) \; + \; \Omega, \tag{A-8}$$

where θ captures the BND's underwriting of some private loans. BND underwriting affects the amount of loans earning revenues for the local bank but does not affect the overall amount of lending or the price of loans. Loans financed from borrowed funds are again the marginal decision, and profit maximization again yields the first-order condition equating loan price to a markup of the marginal cost of finance (equation (A-5)). Defining the profit maximizing ROA*** in a multiple asset model with underwriting as $(\pi^{***}/(L^{B^{***}} - \theta + L^D + S + C))$, dividing both sides of equation (A-8) by $(L^{B^{***}} - \theta + L^D + S + C)$, substituting equation (A-5) into (A-8), and differentiating with respect to θ, we obtain,

$$\frac{dROA^{***}}{d\theta} \; = \; \frac{-(\mu - 1) \bullet R \; + \; ROA^{***}}{(L^{B^{***}} - \theta + L^D + S + C)} \; >=< \; 0, \tag{A-9}$$
$$\theta < L^{B^{***}},$$

where we have assumed that BND's underwriting is less than loans supported by borrowings in order to preserve borrowed funds as the marginal funding source. The effect of BND loan participation on the ROA for local North Dakota banks is ambiguous. The first term in the numerator of equation (A-9) is the marginal profitability per loan and reflects the removal of a profitable loan from the local bank, lowering ROA***. By contrast, the second term in the numerator of equation (A-9) captures the rise in profits per asset as the NDS transfers a loan from its balance sheet to the BND balance sheet, and hence a rise in ROA***.

The sign of BIAS is negative if the absolute value of marginal profitability from lending is greater than average profitability (i.e., ROA). Since lending is likely the most profitable

activity taken by a bank, marginal profitability from lending is expected to exceed the ROA. That expectation is confirmed empirically. Based on sample means for NDS during the latter period, marginal profitability (2.70) exceeds average profitability (1.18), and hence there is some evidence that, in this latter case, BIAS < 0.

BND underwriting has a definitive negative impact on ROE because, unlike ROA, the ROE denominator $[(L^{B***} - \theta + L^D + S + C - (D^B - \theta) - D^D) = (L^{B***} + L^D + S + C - D^B - D^D)]$ (where D^B and D^D are the debt levels for borrowed funds and deposits, respectively) is not affected by the transfers to the BND balance sheet. Thus, the second term in the numerator of equation (A-9) does not appear when computing the impact of an increase in θ,

$$\frac{dROE^{***}}{d\theta} = \frac{-(\mu - 1)\bullet R}{(L^{B***} + L^D + S + C - D^B - D^D)} < 0, \qquad \text{(A-10)}$$

The results for the four cases analyzed above are summarized in the following table:

Table A-1: Response Of Local Bank Profitability To BND Participation Lending

Profitability Measured As	**Lowering The Cost Of Borrowed Funds**	**Underwriting Some Private Bank Loans**
ROA	Negative Equations (A-3) or (A-6)	Ambiguous Equation (A-9) Negative Empirically
ROE	Negative Equation (A-7)	Negative Equation (A-10)

Appendix B: Legislative Interference:
Legislative Bills Authorizing State Agencies
To Borrow From The Bank Of North Dakota, 2021-2023

"Various legislative bills provide state agencies the authority to borrow money from the Bank of North Dakota during the biennium beginning July 1, 2021 and ending June 30, 2023. Following is a summary of legislative action and/or North Dakota Statute in effect" (Bank of North Dakota Annual Report, 2021, pp. 35-40). Thirty-one bills were passed authorizing $2.25 million in transfers. In most cases, actual cash transfers were less than authorizations and totaled $0.98 million. The largest authorization and transfer were $680,000 and $384,558, respectively for infrastructure projects (legislative item 24). [Boldface added.]

1. S.B. 2014, Section 8 – The industrial commission shall transfer to the general fund **$140,000** from the current earnings and the accumulated undivided profits of the Bank of North Dakota during the biennium beginning July 1, 2021 and ending June 30, 2023. The moneys must be transferred in the amounts and at the times requested by the Director of the Office of Management and Budget after consultation with the Bank of North Dakota president. As of December 31, 2021, the Bank has transferred **$0**.

2. S.B. 2014, Section 9 – The Bank shall transfer up to **$26,000** from its current earnings and undivided profits to the Partnership in Assisting Community Expansion Fund. As of December 31, 2021, the Bank had transferred **$7,000**.

3. S.B. 2014, Section 10 – The Bank shall transfer up to **$5,000** from its current earnings and undivided profits to the Agriculture Partnership in Assisting Community Expansion Fund. As of December 31, 2021, the Bank had transferred **$1,000**.

4. S.B. 2014, Section 11 – The Bank shall transfer up to **$1,000** from its current earnings and undivided profits to the Biofuels Partnership in Assisting Community Expansion Fund. As of December 31, 2021, the Bank had transferred **$250**.

5. S.B. 2014, Section 12 – The Bank shall transfer up to **$8,000** from its current earnings and undivided profits to the Beginning Farmer Revolving Loan Fund. As of December 31, 2021, the Bank had transferred **$3,000**.

6. S.B. 2272, Section 6 – The Bank shall transfer the sum of **$2,250** or so much of the sum as may be necessary from its current earnings and undivided profits to the Skilled Workforce Student Loan Repayment Fund during the biennium beginning July 1, 2021 and ending June 30, 2023. As of December 31, 2021, the Bank had transferred **$0**.

7. S.B. 2272, Section 7 – The Bank shall transfer the sum of **$2,250** or so much of the sum as may be necessary from its current earnings and undivided profits to the Skilled Workforce Scholarship Fund during the biennium beginning July 1, 2021 and ending June 30, 2023. As of December 31, 2021, the Bank had transferred **$100**.

8. H.B. 1009, Section 5 – The Bank shall transfer the sum of **$2,700** or so much of the sum as may be necessary from its current earnings and undivided profits to the Agriculture Commissioner for deposit in the Agriculture Products Utilization Commission Fund during the biennium beginning July 1, 2021 and ending June 30, 2023. As of December 31, 2021, the Bank had transferred **$2,700**.

9. H.B. 1009, Section 6 – The Bank shall transfer the sum of **$300** or so much of the sum as may be necessary from its current earnings and undivided profits to the Agriculture Commissioner's Operating Fund during the biennium beginning July 1, 2021 and ending June 30, 2023. As of December 31, 2021, the Bank had transferred **$300**.

10. H.B. 1375, Section 2 – The Bank shall transfer the sum of **$1,500** or so much of the sum as may be necessary from its current earnings and undivided profits to the State Board of Higher Education during the biennium beginning July 1, 2021 and ending June 30, 2023. As of December 31, 2021, the Bank had transferred **$100**.

11. H.B. 1506, Section 2 – The Bank shall transfer the sum of **$750** from current earnings and accumulated undivided profits to the University of North Dakota for expenses associated with campus network upgrades, for the period beginning with the effective date of this Act, and ending June 30, 2023. As of December 31, 2021, the Bank had transferred **$750**.

12. S.B. 2012, Section 6 – The Department of Transportation may borrow from the Bank, up to **$50,000**, which is appropriated to the Department for matching federal funds that may become available, for the biennium beginning July 1, 2021 and ending June 30, 2023. As of December 31, 2021, there was **no outstanding balance**.

13. H.B. 1015, Section 29 – The Bank shall extend a line of credit not to exceed **$250,000** to the industrial commission to support loans or loan guarantees issued from the Clean Sustainable Energy Fund. The interest rate associated with the line of credit must be the prevailing interest rate charged to North Dakota government entities. As of December 31, 2021, the Bank **had not extended any credit**.

14. H.B. 1016, Section 6 – The Office of the Adjutant General may borrow from the Bank the sum of **$2,500**, or so much as may be necessary, for fire emergency and wildfire response mutual aid, for the period beginning with the effective date of this Act and ending June 30, 2023. As of December 31, 2021, the Bank had transferred **$0**.

15. H.B. 1020, Section 7 – The Bank of North Dakota shall extend a line of credit not to exceed **$50,000** at a rate of one and one-half percent over the three-month London interbank offered rate but may not exceed three percent to the State Water Commission. The State Water Commission shall repay the line of credit from funds available in the Resources Trust Fund, Water Development Trust Fund, or other funds, as appropriated by the legislative assembly.
The State Water Commission may access the line of credit, as necessary, to provide funding as authorized by the legislative assembly for the Northwest Area Water Supply project during the biennium beginning July 1, 2021, and ending June 30, 2023. As of December 31, 2021, there **was no outstanding loan balance**.

16. H.B. 1087, Section 8 – The Bank of North Dakota shall extend a line of credit not to exceed **$25,000** to the Reinsurance Association during the biennium beginning July 1, 2021 and ending June 30, 2023. As of December 31, 2021, the Bank **had not extended any credit**.

17. H.B. 1025, Section 3 – It is the intent of the sixty-seventh legislative assembly that the Attorney General seek reimbursement from the federal government for the costs of responding to unlawful activity associated with the construction of the Dakota Access Pipeline. It is further the intent of the sixty-seventh legislative assembly that these reimbursements be used to repay the Bank of North Dakota loans authorized by the Emergency Commission and the Legislative Assembly which were obtained to provide the funding necessary to respond to the unlawful activity associated with the construction of the Dakota Access Pipeline. It is the further intent of the sixty-seventh legislative assembly that the provisions of section 54-16-13 apply to the loans, except that Emergency Commission approval does not apply. The unpaid principal balance as of December 31, 2021 and 2020 was **$13,362** and $13,971,respectively.

18. S.B. 2124, Section 1 – The Bank of North Dakota shall adopt rules to administer, manage, promote, and market the North Dakota Achieving a Better Life Experience Plan. The Bank shall ensure the North Dakota Achieving a Better Life Experience Plan is maintained in compliance with internal revenue service standards for qualified state disability expense programs. The Bank, as trustee of the North Dakota Achieving a Better Life Experience Plan, may impose an annual administrative fee to recover expenses incurred in connection with operation of the plan. Administrative fees received by the Bank are appropriated to the Bank on a continuing basis to be used as provided under this section. Money and assets in North Dakota Achieving a Better Life Experience Plan accounts or in qualified Achieving a Better Life Experience plan accounts in any state may not be considered for the purpose of determining eligibility to receive, or the amount of, any assistance or benefits from local or state means-tested programs.

19. S.B. 2014, Section 17 – This bill is an amendment to Section 6-09-49 regarding the Infrastructure Revolving Loan Fund and provide definition for “essential infrastructure projects”. No new funding was provided, and no other changes to the program were made. The Infrastructure Revolving Loan Fund is a special fund in the State Treasury from which the Bank of North Dakota shall provide loans to political subdivisions for essential infrastructure projects. The Bank shall administer the Infrastructure Revolving Loan Fund. The maximum term of a loan made under this section is thirty years. A loan made from the Fund under this section must have an interest rate that does not exceed two percent per year. For purposes of this section, "essential infrastructure projects" means capital construction projects to construct new infrastructure or replace existing infrastructure, which provide the fixed installations necessary for the function of a political subdivision. As of December 31, 2021, outstanding loans totaled **$112,650**.

20. S.B. 2272, Section 3 – In addition to any construction loans made available under section 15.1-36-02, the Bank of North Dakota may provide up to **$250,000** to eligible school districts for school construction loans until June 30, 2017. After June 30, 2017, no new loans may be provided under this section. With the advice and consent of the Superintendent of Public Instruction, the Bank of North Dakota shall award the loans in accordance with a prioritization system that is based on a review of all applications filed during the twelve-month period preceding April 1st. The term of a loan under this section is twenty years, unless a shorter term is requested by the board of a school district in its application. The interest rate on a loan under this section may not exceed two percent, until July 1, 2025. Thereafter, the interest rate on the loan is subject to change. The maximum loan amount to which a school district is entitled under this section is $20,000. As of December 31, 2021, the outstanding balance was **$18,268**.

21. S.B. 2272, Section 4 – Provides for the creation of the School Construction Assistance Revolving Loan Fund. The School Construction Assistance Revolving Loan Fund is a special revolving loan fund administered by the Bank of North Dakota. The Fund consists of all moneys appropriated or transferred to the Fund by the Legislative Assembly and all interest or other earnings of the Fund, and all repayments of loans made from the Fund. Moneys in the Fund, interest upon the moneys in the Fund, and payments to the Fund of principal and interest are appropriated to the Bank of North Dakota on a continuing basis for the purpose of providing low-interest school construction loans and for paying administrative costs, in accordance with this section. With the advice and consent of the Superintendent of Public Instruction, the Bank of North Dakota shall award the loans in accordance with a prioritization system that is based on a review of all applications filed during the twelve-month period preceding April 1st. The maximum loan amount for which a school district may qualify is $10,000. The term of the loan is twenty years, unless the board of the school district requests a shorter term in the written loan application. The interest rate of the loan may not exceed two percent per year. The Bank may adopt policies and establish guidelines to administer this loan program in accordance with this section. The Bank of North Dakota may use a portion of the interest paid on the outstanding loans as a servicing fee to pay for administration costs which may not exceed one - half of one percent of the amount of the interest payment. The Bank of North Dakota shall deposit principal and interest payments made by school districts for loans under this section in the School Construction Assistance Revolving Loan Fund. The Bank of North Dakota shall arrange for the conduct of an annual audit of the School Construction Assistance Revolving Loan Fund, the cost of which must be paid from the Fund and which must be conducted by an independent accounting firm. As of December 31, 2021, outstanding loans in the School Construction Assistance Revolving Loan Fund totaled **$272,312**.

22. S.B. 2014, Section 32 – Pursuant to the continuing appropriation authority under section 15.1-36-08, $2,500, or so much of the sum as may be necessary, is available from the School Construction Assistance Revolving Fund to the Bank to provide interest rate buydowns associated with loans issued under section 15.1-36-06. In addition, provided sufficient funding is available for loans to local school districts, the Bank may utilize funding from the School Construction Assistance Revolving Loan Fund to repay a portion of the outstanding principal balance of loans issued under section 15.1-36-06 for the purpose of transferring a portion of the loans issued under that section from the Bank to the School Construction Assistance Revolving Loan Fund. As of December 31, 2021, **$95,145** in school construction assistance revolving loans have been transferred from the Bank to the School Construction Assistance Revolving Loan Fund.

23. H.B. 1008, Section 4 – The Bank of North Dakota shall transfer from the Beginning Farmer Revolving Loan Fund to the Public Service Commission the sum of **$900**, or so much of the sum as may be necessary, included in the estimated income line item in section 1 of this Act to pay for costs associated with a rail rate complaint case. Transfers must be made during the biennium beginning July 1, 2021, and ending June 30, 2023, upon order of the Commission. If any amounts are spent pursuant to this section, the Public Service Commission shall reimburse the Beginning Farmer Revolving Loan Fund using amounts available from damages or proceeds received, net of legal fees, from a successful outcome of a rail complaint case. As of December 31, 2021, the Bank had transferred **$0**.

24. H.B. 1431, Section 7 – Pursuant to the bonding authority under section 6-09.4-06, the Public Finance Authority may issue up to **$680,000** of bonds for transfer to the Bank of North Dakota for allocations to infrastructure projects and programs, for the biennium beginning July 1, 2021, and ending June 30, 2023. As of December 31, 2021, the Bank has received and transferred to Public Finance Authority **$384,558**.

25. *State Water Commission*
Under chapter 61-02.1-04 of North Dakota Century Code, principal and interest on bonds issued are payable from transfers to be made and appropriated by the Legislative Assembly from the Water Development Trust Fund as provided in section 61-02.1-05, then from transfers to be made and appropriated by the Legislative Assembly from revenues in the Resources Trust Fund other than revenues from state taxes, then from appropriations of other available revenues in the then current biennium, and then from any other revenues the State Water Commission makes available during the then current biennium for that purpose, including any federal moneys received by the state for the construction of flood control or reduction projects to pay bonds issued for that project. If sufficient funds from these sources are not available, then from transfers to be made and appropriated by the Legislative Assembly from the first available current biennial earnings of the Bank of North Dakota not to exceed $6,500 per biennium prorated with any other bonds payable from transfers to be made and appropriated by the Legislative Assembly from the available current biennial earnings of the Bank of North Dakota, to be credited by the Trustee to the Fund established for paying principal and interest on the bonds under a trust indenture. If the Bank has to provide a transfer to the State Water Commission to make principal and interest payments on these bonds, the State Water Commission would then have to request from the next Legislative Assembly funding to repay the transfer made by the bank. As of December 31, 2021, the Bank **has provided no such transfers.**

26. *Farm Real Estate Loan Guarantee Program*
Chapter 6-09.7-09 provides that the Bank of North Dakota may guarantee the loan of money by banks, credit unions, lending institutions that are part of the farm credit system, and savings and loan associations in this state to eligible persons for the purchase of agricultural real estate or the restructuring of agricultural real estate loans, provided the transactions do not exceed a loan to value ratio of 80% and further provided that no single loan exceeds $400. The Bank may have no more than **$8,000** in outstanding loan guarantees under this Program. The Bank may guarantee up to 75% of the amount of principal due the lender. The guarantee term may not exceed 5 years. As of December 31, 2021, and 2020, the Bank had guarantees outstanding totaling **$0** and $241, respectively, and had no guarantee commitments outstanding, respectively, included in commitments to extend credit. The Bank has not recorded a contingent liability related to the guarantee loan program as of December 31, 2021 and 2020.

27. *Self-Insurance Health Plan – Bank of North Dakota Line of Credit*
Chapter 54-52.1 provides that the Bank shall extend to the Public Employees' Retirement Board a line of credit not to exceed **$50,000**. The Board shall repay the line of credit from health insurance premium revenue or repay the line of credit from other funds appropriated by the Legislative Assembly. The Board may access the line of credit to the extent necessary to provide adequate claims payment funds, to purchase stop-loss coverage, and to defray other expenditures of administration of the self-insurance health plan. As of December 31, 2021, the outstanding loan balance was **$0**.

28. *Invisible Reinsurance Pool – Bank of North Dakota Line of Credit*
Chapter 26.1-36.7-.07 provides that the Bank shall extend to the Reinsurance Association of North Dakota a line of credit not to exceed **$25,000**. The Association shall repay the line of credit from assessments against insurers writing or otherwise issuing group health benefit plans in this state or from other funds appropriated by the Legislative Assembly. As of December 31, 2021, the outstanding loan balance was **$0**.

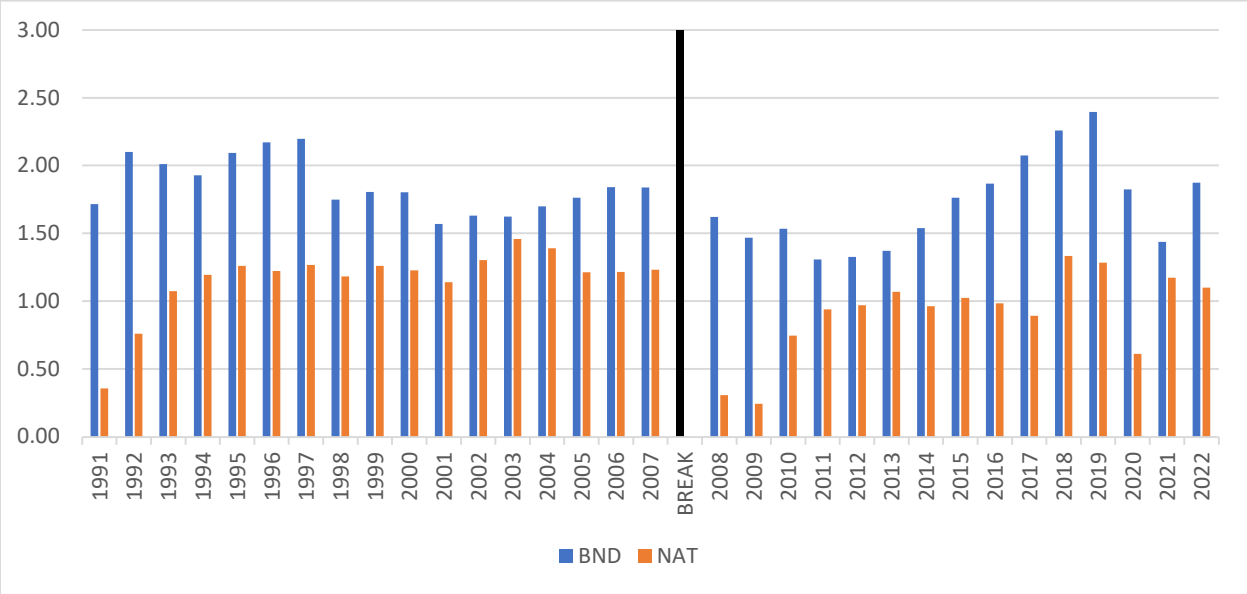
29. *Establishment and Maintenance of Adequate Guarantee Funds – Use of Strategic Investment and Improvement Funds*
Chapter 6-.09.7-05 provides that the Bank shall establish and at all times maintain an adequate guarantee reserve fund in a special account at the Bank. The Bank may request the Director of the Office of Management and Budget to transfer funds from the Strategic Investment and Improvement Fund (SIIF) created by this section 15-08.1-08 to maintain one hundred percent of the guarantee reserve fund balance. Transfers from SIIF may not exceed a total of **$80,000**. Moneys in the guarantee reserve fund are available to reimburse lenders for guaranteed loans in default. The securities in which the moneys in the reserve fund may be invested must meet the same requirements as those authorized for investment under the State Investment Board. The income from such investments must be made available for the costs of administering the program and must be deposited in the reserve fund. The amount of the reserves for all guaranteed loans must be determined by a formula that will assure, as determined by the Bank, an adequate amount of reserve. As of December 31, 2021, the balance in the reserve fund was **$42,257**.

30. *Beginning Entrepreneur Loan Guarantee Program*
Chapter 6-09.15 provides that the Bank of North Dakota provide a Beginning Entrepreneur Loan Guarantee Program. The Program includes an agreement with a lender that in the event of default by a beginning entrepreneur under a note and mortgage or other loan or financing agreement, the Bank shall pay the lender the amount agreed upon up to 85% of the amount of principal due the lender on a loan at the time the claim is approved. The total outstanding loans that the Bank may guarantee cannot exceed 5% of the Bank's tier one capital as defined by the Department of Financial Institutions. A lender may apply to the Bank for a loan guarantee for a loan up to $500. The term of the guarantee may not exceed five years. As of December 31, 2021, and 2020, the Bank has guarantees outstanding totaling $7,414 and $8,274, respectively, and had guarantee commitments outstanding of $188 and $0, respectively, included in commitments to extend credit. The Bank **has not recorded a contingent liability** related to the guarantee loan program as of December 31, 2021 and 2020.

31. *Rebuilders Permanent Loan Fund*

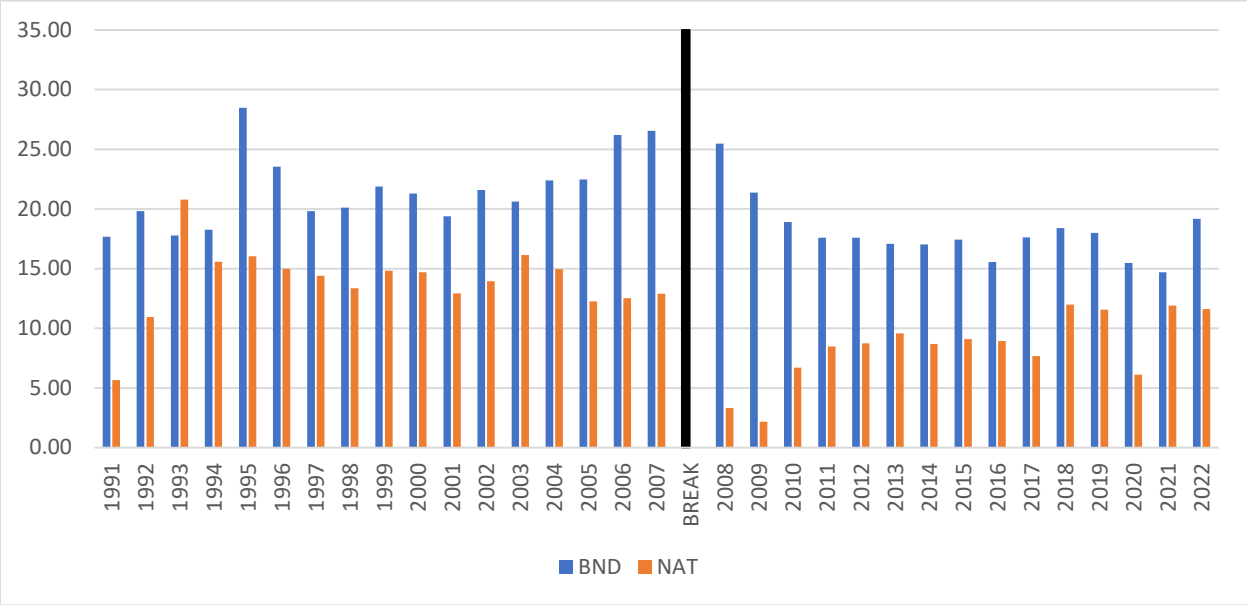
H.B. 1187, Section 3 of the sixty-seventh legislative session combined the Small Employer Loan Fund with the Rebuilders Permanent Loan Fund. In response to the COVID-19 pandemic, the Bank of North Dakota created the Small Employer Loan Fund (SELF) to assist small businesses. The SELF program allowed businesses with a physical presence in North Dakota, and 10 full-time equivalents or less to borrow up to $50 at one percent interest over 120 months. The Bank received applications for assistance up to November 30, 2020. The Bank committed up to **$50,000** of capital or so much as the sum as needed. As of December 31, 2021, the Bank transferred **$30,000.**

FIGURE 1
Profitability: Return On Assets (ROA)
Bank Of North Dakota And National Banks
1991-2022



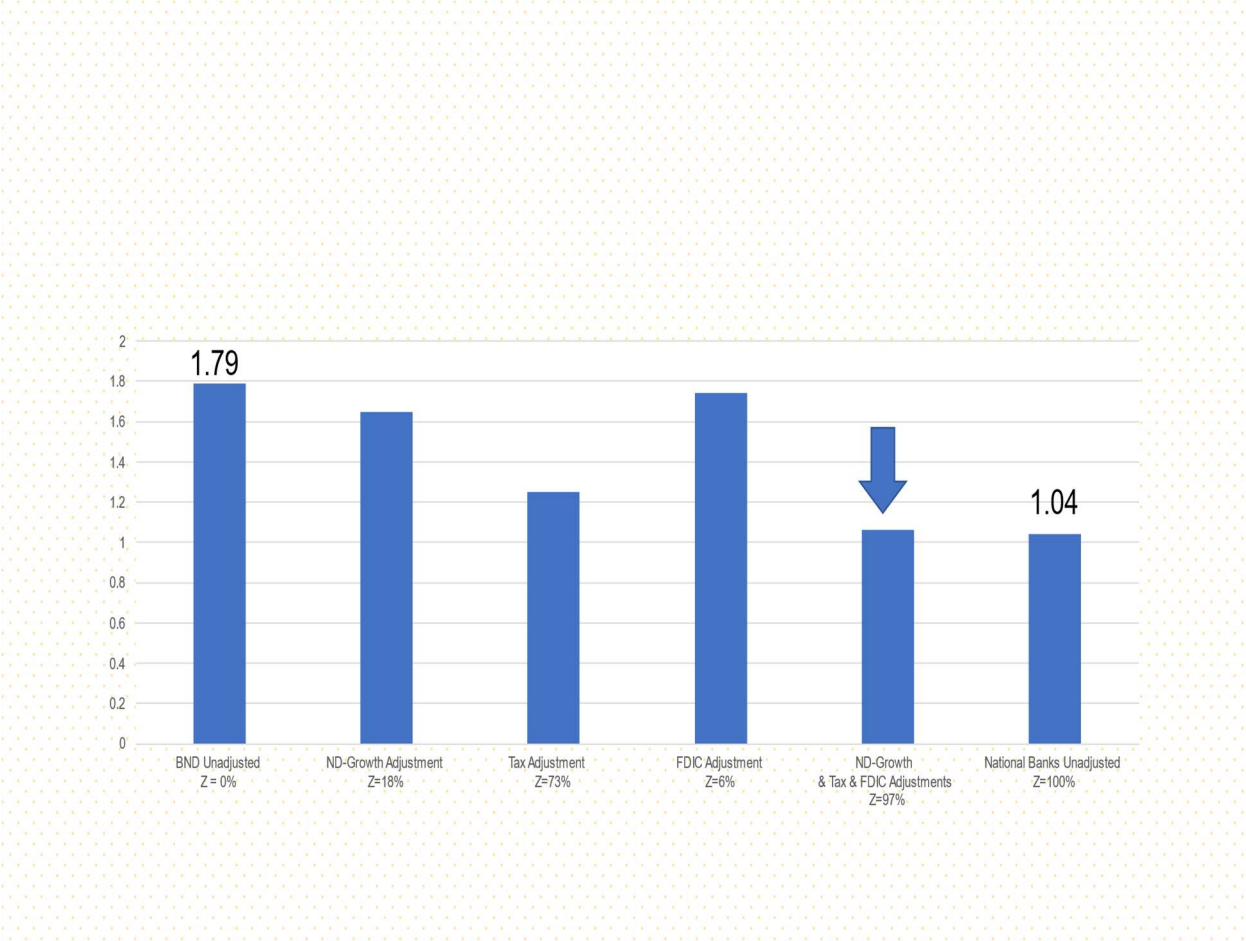
Notes To Figure 1: See the Notes To Table 1. The vertical BREAK line between 2007 and 2008 represents a change in the fiscal year for NAT that nearly halves the sample.

FIGURE 2
Profitability: Return On Equity (ROE)
Bank Of North Dakota And National Banks
1991-2022



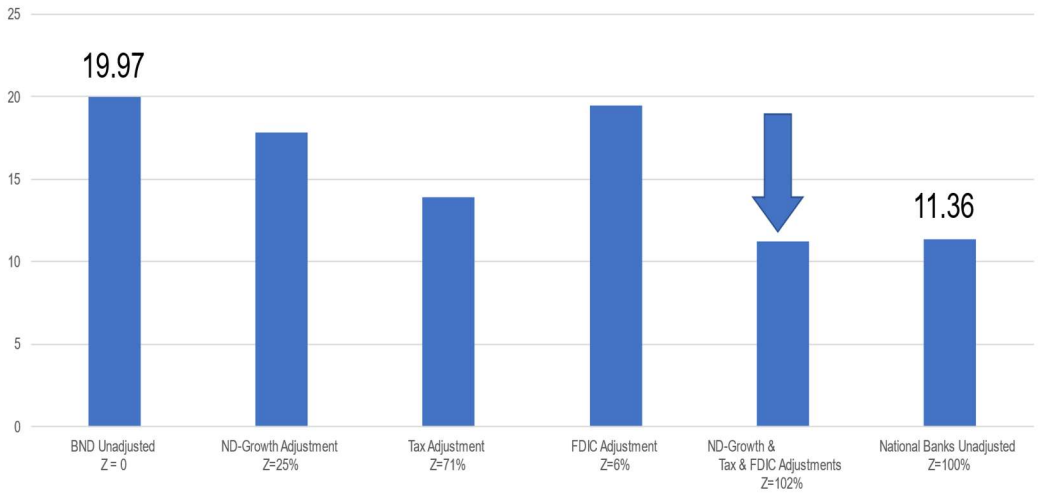
Notes To Figure 2: See the Notes To Table 2. The vertical BREAK line between 2007 and 2008 represents a change in the fiscal year for NAT that nearly halves the sample.

FIGURE 3
Bank of North Dakota Profitability: Return On Assets (ROA)
Unadjusted And Adjusted
1991-2022



Notes To Figure 3: See the discussions in Sections V and VI. The Z-statistics gauge the extent to which the three profitability adjustments, either in isolation or combination, reduce the gap between reported BND and NAT profitability (cf. equation (2)). This gap is referred to as the BND Premium. For the Z-statistics, the denominator is the profitability difference between BND and NAT to be explained; the numerator is the profitability difference explained by a given adjustment(s). In a loose sense, the Z-statistic is a goodness-of-fit statistic measuring the explanatory power of an adjustment(s).

FIGURE 4
Bank of North Dakota Profitability: Return On Equity (ROE)
Unadjusted And Adjusted
1991-2022



Notes To Figure 4: See the discussions in Sections V and VI. The Z-statistics gauge the extent to which the three profitability adjustments, either in isolation or combination, reduce the gap between reported BND and NAT profitability (cf. equation (2)). This gap is referred to as the BND Premium. For the Z-statistics, the denominator is the profitability difference between BND and NAT to be explained; the numerator is the profitability difference explained by a given adjustment(s). In a loose sense, the Z-statistic is a goodness-of-fit statistic measuring the explanatory power of an adjustment(s).

TABLE 1
Profitability (%'s): Return On Assets (ROA)

	BND	NAT	BND – NAT = BND Premium
	(1)	(2)	(3)
A. 1991-2022—Benchmark Sample			
Mean Of Ratios	1.79	1.04	0.74
Standard Deviation	0.28	0.31	-0.03
Coefficient Of Variation	0.16	0.29	-0.13
P-value For Equal Means (multiplied by 100)	-----	0.00	----------
Ratio Of Means	1.75	1.01	0.74
Number Of Banks	1	1,867	----------
B. 1991-2007—Split Sample, June FY / Early			
Mean Of Ratios	1.86	1.16	0.70
Standard Deviation	0.20	0.25	-0.05
Coefficient Of Variation	0.11	0.22	-0.11
P-value For Equal Means (multiplied by 100)	-----	0.00	----------
Ratio Of Means	1.81	1.21	0.60
Number Of Banks	1	2,553	----------
C. 2008-2022—Split Sample, December FY / Late			
Mean Of Ratios	1.71	0.91	0.80
Standard Deviation	0.34	0.32	0.02
Coefficient Of Variation	0.20	0.35	-0.15
P-value For Equal Means (multiplied by 100)	-----	0.00	----------
Ratio Of Means	1.74	0.94	0.80
Number Of Banks	1	1,089	----------
D. 1981-2022—Max Sample			
Mean Of Ratios	1.65	0.93	0.72
Standard Deviation	0.37	0.36	0.01
Coefficient Of Variation	0.22	0.39	-0.17
P-value For Equal Means (multiplied by 100)	-----	0.00	----------
Ratio Of Means	1.72	0.98	0.74
Number Of Banks	1	2,516	----------

--continued--

TABLE 1
Profitability (%'s): Return On Assets (ROA)
(continued)

Notes To Table 1: The sample period varies in the four panels. The date for splitting the sample between 2007 and 2008 was chosen because of a change in the ending month of the fiscal year for NAT from June to December; this date nearly splits the sample in half. The Mean Of Ratios and Ratio Of Means stated in percents. ROA computed as net income divided by total assets. Net income is net of extraordinary gains. BND = Bank Of North Dakota; NAT = national banks; BND-NAT the profitability gap between the first two entries in a row, labeled the BND Premium. "P-value For Equal Means" evaluates the null hypothesis of the equality of the "Mean Of Ratios" for BND and NAT, multiplied by 100; that is, 5.00 represents significance at the 5% level for a two-tailed t-test. See the discussions in Section III.B for details about data sources and the sample periods.

TABLE 2
Profitability (%'s): Return On Equity (ROE)

	BND	NAT	BND – NAT = BND Premium
	(1)	(2)	(3)
A. 1991-2022—Benchmark Sample			
Mean Of Ratios	19.97	11.36	8.62
Standard Deviation	3.36	4.05	-0.69
Coefficient Of Variation	0.17	0.36	-0.19
P-value For Equal Means (multiplied by 100)	----------	0.00	----------
Ratio Of Means	18.25	9.93	8.32
Number Of Banks	1	1,867	----------
B. 1991-2007—Split Sample, June FY / Early			
Mean Of Ratios	21.64	13.93	7.71
Standard Deviation	3.10	3.04	0.06
Coefficient Of Variation	0.14	0.22	-0.08
P-value For Equal Means (multiplied by 100)	----------	0.00	----------
Ratio Of Means	21.79	13.74	8.05
Number Of Banks	1	2,553	----------
C. 2008-2022—Split Sample, December FY / Late			
Mean Of Ratios	18.09	8.44	9.65
Standard Deviation	2.61	2.94	-0.33
Coefficient Of Variation	0.14	0.35	-0.21
P-value For Equal Means (multiplied by 100)	----------	0.00	----------
Ratio Of Means	17.45	8.76	8.69
Number Of Banks	1	1,089	----------
D. 1981-2022—Max Sample			
Mean Of Ratios	19.36	10.93	8.43
Standard Deviation	3.47	4.12	-0.65
Coefficient Of Variation	0.18	0.38	-0.20
P-value For Equal Means (multiplied by 100)	----------	0.00	----------
Ratio Of Means	18.19	9.90	8.29
Number Of Banks	1	2,516	----------

--continued--

TABLE 2
Profitability (%'s): Return On Equity (ROE)
(continued)

Notes To Table 2: The sample period varies in the four panels. The date for splitting the sample between 2007 and 2008 was chosen because of a change in the ending month of the fiscal year for NAT from June to December; this date nearly splits the sample in half. The Mean Of Ratios and Ratio Of Means stated in percents. ROE computed as net income divided by book equity. Net income is net of extraordinary gains. BND = Bank Of North Dakota; NAT = national banks; BND-NAT the profitability gap between the first two entries in a row, labeled the BND Premium. "P-value For Equal Means" evaluates the null hypothesis of the equality of the "Mean Of Ratios" for BND and NAT, multiplied by 100; that is, 5.00 represents significance at the 5% level for a two-tailed t-test. See the discussions in Section III.B for details about data sources and the sample periods.

TABLE 3
Deposits And Interest Expenses (%'s)

	Benchmark Sample 1991-2022	Split Sample Early 1991-2007	Split Sample Late 2008-2022	Maximum Sample 1981-2020
	(1)	(2)	(3)	(4)
A. Deposits / Assets				
BND	67.86	61.03	75.60	65.99
NAT	71.42	68.89	74.29	72.62
BND – NAT = BND Premium	-3.56	-7.86	1.30	-6.63
P-value For Equal Means (multiplied by 100)	6.47	0.01	49.73	0.01
B. Deposits / Liabilities				
BND	74.71	66.87	83.60	72.32
NAT	78.94	75.13	83.26	79.47
BND – NAT = BND Premium	-4.23	-8.26	0.34	-7.15
P-value For Equal Means (multiplied by 100)	5.00	0.01	85.98	0.02
C. Interest Expense (Deposits) / Deposits				
BND	1.86	3.05	0.51	2.96
NAT	1.81	3.01	0.46	2.97
BND – NAT = BND Premium	0.05	0.04	0.05	-0.01
P-value For Equal Means (multiplied by 100)	90.34	90.59	74.37	97.90

Notes To Table 3: The sample period varies in the three panels. Data are tabulated as Means Of Ratios and stated in percents in all but the last row of each panel. BND = Bank Of North Dakota; NAT = national banks; BND-NAT the profitability gap between the first two entries in a column in a panel, labeled the BND Premium. "P-value For Equal Means" evaluates the null hypothesis of the equality of the "Mean Of Ratios" for BND and NAT, multiplied by 100; that is, 5.00 represents significance at the 5% level for a two-tailed t-test. See the discussions in Section III.B for details about data sources and the sample periods and Section IV.A for an analysis of these statistics.

TABLE 4
Loans: Income, Losses, And Net Margin (%'s)

	Benchmark Sample 1991-2022	Split Sample Early 1991-2007	Split Sample Late 2008-2022	Maximum Sample 1981-2020
	(1)	(2)	(3)	(4)
A. Loan Income (Gross) / Loans				
BND	5.45	6.73	4.01	6.53
NAT	6.37	7.73	4.82	7.64
BND – NAT = BND Premium	-0.91	-1.01	-0.81	-1.11
P-value For Equal Means (multiplied by 100)	3.46	1.76	0.01	6.09
B. Loan Loss Provisions (Flow) / Loans				
BND	0.22	0.21	0.23	0.52
NAT	0.93	0.85	1.02	0.97
BND – NAT = BND Premium	-0.71	-0.64	-0.79	-0.45
P-value For Equal Means (multiplied by 100)	0.00	0.00	1.03	1.72
BND - NAT (Ratio Of Means)				
C. Loan Income (Net) / Loans				
BND	5.23	6.51	3.78	6.01
NAT	5.43	6.88	3.80	6.67
BND – NAT = BND Premium	-0.20	-0.37	-0.02	-0.66
P-value For Equal Means (multiplied by 100)	63.61	32.96	92.70	23.75
D. Net Loan Profit Margin				
BND	3.39	3.70	3.03	3.47
NAT	3.45	3.66	3.21	3.56
BND – NAT = BND Premium	-0.06	0.05	-0.17	-0.09
P-value For Equal Means (multiplied by 100)	75.20	82.59	51.84	64.85

Notes To Table 4: The sample period varies in the four panels. Data are tabulated as Means Of Ratios and stated in percents in all but the last row of each panel. Net Loan Profit Margin computed as Loan Income (Gross) less Loan Loss Provisions (Flow) less Allocated Interest Expense, all divided by Loans (Gross); Allocated Interest Expense is computed as Interest Expense (Total) multiplied by the ratio of Loans (Gross) to Liabilities (Total). BND = Bank Of North Dakota; NAT = national banks; BND-NAT the profitability gap between the first two entries in a column in a panel, labeled the BND Premium. "P-value For Equal Means" evaluates the null hypothesis of the equality of the "Mean Of Ratios" for BND and NAT, multiplied by 100; that is, 5.00 represents significance at the 5% level for a two-tailed t-test. See the discussions in Section III.B for details about data sources and the sample periods and Section IV.B for an analysis of these statistics.

TABLE 5
Real GDP Growth Rates (%'s):
North Dakota And Two Control Groups

	Full Sample 1998-2022	Split Sample, First Part 1998-2007	Split Sample, Second Part 2008-2022	Difference In Split Samples (cols. 3 – 2)
	(1)	(2)	(3)	(4)
	A. North Dakota Growth Rates, Normalized			
Controls -- Unweighted				
Bordering States	1.21	0.03	1.64	1.61
Bordering States + Wyoming	1.37	-0.44	2.25	2.69
Controls -- Weighted				
Bordering States	1.46	0.48	1.77	1.30
Bordering States + Wyoming	1.49	0.28	1.97	1.68
Controls – United States	1.35	0.52	1.44	0.92
	B. State, Group, And National Growth Rates, Unnormalized			
North Dakota	3.60	3.45	3.41	-0.04
Minnesota	2.03	2.78	1.57	-1.21
Montana	2.37	3.28	1.96	-1.32
South Dakota	2.76	4.19	1.76	-2.43
3 States Unweighted	2.38	3.42	1.76	-1.65
3 States Weighted	2.14	2.98	1.63	-1.34
Wyoming	1.77	5.31	-0.68	-5.99
4 States Unweighted	2.23	3.89	1.15	-2.74
4 States Weighted	2.11	3.17	1.44	-1.73
United States	2.25	2.93	1.96	-0.97

TABLE 5
Real GDP Growth Rates (%'s):
North Dakota And Two Control Groups
(continued)

Notes To Table 5: The sample periods are 1998 to 2022 -- the full sample – in column 1, 1998 to 2007 and 2008 to 2022 – the early and late split samples – in columns 2 and 3, respectively. All entries in columns 1 to 3 are annual geometrically-averaged growth rates stated in percents. Column 4 is the arithmetic difference between columns 3 and 2. Panel A normalizes the North Dakota growth rate by subtracting growth rates of three control groups: 1) the three states that border North Dakota (Minnesota, Montana, and South Dakota); 2) these three states plus Wyoming, which nearly borders North Dakota and has a large oil and gas sector; 3) all 50 states. For the Bordering States and the Boarding States + Wyoming, normalizations are computed with control group growth rates that are either unweighted or weighted. The unweighted statistic is preferred because of Minnesota's dominant influence; its GDP is approximately 2.5 times larger than the combined GDP for the other three states. Panel A also contains a normalization based on all 50 states. Panel B contains the growth rates by state, by groups of states ([3] for the Bordering States and [4] for the Bordering States + Wyoming, each of which is presented unweighted and weighted), and for all 50 states. The growth rates in Panel B are unnormalized. The source of the GDP data is the BEA (website) with a base year of 2017.

TABLE 6
The 'Secret Sauce'?:
The State Bank Of North Dakota
Profitability (%'s)

	Adjustments To BND					Unadjusted		
	ND-Growth	**Tax Status**	**Risk-Shifting**	**Combined**		**BND**	**NAT**	**BND Premia**
	(1)	(2)	(3)	(4)		(5)	(6)	(7)
A. Return On Assets (ROA)								
ROA	1.65	1.25	1.74	1.06		1.79	1.04	0.74
Difference	0.13	0.54	0.05	0.72		-----	-----	-----
Z-Statistic	18%	73%	6%	97%		-----	-----	-----
B. Return On Equity (ROE)								
ROE	17.84	13.89	19.44	11.22		19.97	11.36	8.62
Difference	2.13	6.09	0.54	8.76		-----	-----	-----
Z-Statistic	25%	71%	6%	102%		-----	-----	-----

Notes To Table 6: The sample period is the benchmark sample period, 1991-2022. All entries in percents. ND-Growth is an adjustment for the abnormally high growth rate in North Dakota owing to the fracking boom; see Section V.A. Tax Status is an adjustment for the tax-free status of the BND; see Section V.B. Risk-Shifting is an adjustment for the default risk shifted to North Dakota taxpayers; see Section V.C. Combined sums the prior three adjustments. The Z-statistic (equation (1)) measures the extent to which an adjustment explains the difference between BND and NAT profitability. The denominator is the profitability difference between BND and NAT to be explained; the numerator is the profitability difference explained by a given adjustment. In a loose sense, the Z-statistic is a goodness-of-fit statistic measuring the explanatory power of an adjustment. Unadjusted figures in columns 5, 6, and 7 are from Table 1 for ROA and Table 2 for ROE.

TABLE 7
Liquidity: Cash, Federal Funds, And Net Cash (%'s)

	Benchmark Sample 1991-2022	Split Sample Early 1991-2007	Split Sample Late 2008-2022	Maximum Sample 1981-2020
	(1)	(2)	(3)	(4)
A. Cash / Assets				
BND	10.75	9.86	11.76	9.85
NAT	7.06	6.17	8.08	8.56
BND–NAT=BND Premium	3.68	3.69	3.68	1.30
P-value For Equal Means (multiplied by 100)	0.23	0.00	13.33	21.12
B. Federal Funds Sold / Assets				
BND	5.72	10.21	0.63	11.49
NAT	4.25	4.29	4.19	4.25
BND–NAT=BND Premium	1.48	5.92	-3.56	7.24
P-value For Equal Means (multiplied by 100)	15.01	0.00	0.00	0.02
C. Federal Funds Bought / Assets				
BND	11.03	16.21	5.17	14.53
NAT	5.44	7.71	2.86	6.26
BND–NAT=BND Premium	5.59	8.50	2.30	8.26
P-value For Equal Means (multiplied by 100)	0.01	0.00	0.90	0.00
D. Net Federal Funds Bought / Assets				
BND	5.31	5.99	4.53	3.04
NAT	1.19	3.42	-1.33	2.02
BND–NAT=BND Premium	4.12	2.57	5.87	1.02
P-value For Equal Means (multiplied by 100)	0.00	1.99	0.00	32.08
E. Net Cash / Assets				
BND	5.44	3.86	7.22	6.82
NAT	5.87	2.75	9.41	6.54
BND–NAT=BND Premium	-0.43	1.11	-2.19	0.28
P-value For Equal Means (multiplied by 100)	73.98	33.80	29.40	81.83

--continued--

TABLE 7
Liquidity: Cash, Federal Funds, And Net Cash (%'s)
(continued)

Notes To Table 7: The sample period varies in the five panels. Data are tabulated as Means Of Ratios and stated in percents. Net Cash defined as cash plus Federal Funds sold less Federal Funds purchased. BND = Bank Of North Dakota; NAT = national banks; BND-NAT the profitability gap between the first two entries in a column in a panel, labeled the BND Premium. "P-value For Equal Means" evaluates the null hypothesis of the equality of the "Mean Of Ratios" for BND and NAT, multiplied by 100; that is, 5.00 represents significance at the 5% level for a two-tailed t-test. See the discussions in Section III.B for details about data sources and the sample periods and Section V.C for an analysis of these statistics.

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