For Investment Professionals Only

VALHALLA

NETWORK

Whitepaper V3.2

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Abstract

"In order to raise productivity, [we] need to establish many local community banks, which enable small firms to always upgrade to the latest technologies and hence be highly competitive and productive..."

Richard A. Werner, 2021

Banks and blockchain-based alternatives do not need to stand against each other. Currently, they often do because mainstream banks are viewed as centralised aggregations of power that want to force dependence at public expense. The ethos of DeFi is the opposite: it aspires to do public good by using the Blockchain to create trusted decentralised solutions that can return economic freedom and stability to individuals. Valhalla Network brings that ethos to banking through a sustainable and self-perpetuating model.

Valhalla Network's mission is to build a network of community banks governed by a structure akin to a decentralised autonomous organisation ('DAO') - an emerging legal [corporate] structure with a distributed control & governance mechanism [instead of a central governing body such as a board of directors], whose members share the common goal of acting in the best interest of the project, and where smart contracts are used to ensure transparency of operations and decision-making. To govern this, Valhalla Network will establish a Foundation accountable to tokenholders and overseen by an executive council. Tokenholders are automatically assigned voting rights and exercise these, in return for rewards, to action proposals that protect and further the mission. The power of each token is intentionally reductive to ensure that no single holder is able to accumulate a dominant majority vote.

As the majority shareholder, the Foundation will fulfil the commitment of reinvesting a percentage of the profits generated by the banks, to build and launch more community banks. To ensure the benefits of this model are fully amplified, each community bank will establish a charitable foundation of its own that will be dedicated to reinvesting profits it receives to fund local community initiatives and development programmes.

What makes this model different is that it focuses on the community it serves, ahead of profits. By definition each community bank must still be profitable - not-for-profit is different from non-profit - it is the use and allocation of their profits that differs. Instead of extracting intrinsic value that is generated at community levels (by synthetically maximising fees, avoiding taxes and so on), community banks lend ethically and work hand-in-hand with local enterprise and small businesses to support growth. They provide apprenticeships and training in financial literacy, as well as guiding companies as they develop. This results in more dynamic economies, healthier competition and greater general prosperity. In the majority of countries, small businesses and local enterprise together remain the biggest employer overall and are the backbone of a healthy economy - communities need banks that can and will serve their needs.

The long-term potential of this project is founded on the principle that locally-run banks will remain accountable to the communities they serve. Furthermore, historical performance has shown that this tried and tested structure rarely fails, and by virtue of being de-coupled from fiscal shocks (compared to centralised equivalents), has been proven sturdy enough to withstand economic swings where other institutions have failed - for example, not one community bank in Germany required taxpayer bailout during the 2008 financial crisis.

Therefore, while a not-for-profit bank might seem improbable these days, it is in fact one of the lowest risk and most stable structures that exist, with a long history of success and resilience.

Although challenged by recent centralisation policies, community banks continue to thrive, most notably in three of the world's largest economies: the USA, Germany, and China.

Before Valhalla Network can launch a community bank, it needs to build a capital generating "engine" that can help fund the creation of more banks and start rewarding the DAO community tokenholders. To this end, we will launch a single for-profit 'Anchor bank' dedicated to providing diversified and low-risk services, through a unique model designed to be highly profitable and generate the capital needed to start building new community banks. After the Anchor bank starts operating, the DAO will vote on how to distribute profits, including funding of mission costs and development.

Investors in Valhalla Network have a unique opportunity to be part of a high-growth solution for which there is pent-up demand before it even launches. Nevertheless, banking licence applications do take time and conditions are strict so we have built-in downside risk controls which stand out among many start-ups:

- to apply for the licence all funding must be in place, and to secure the licence, the bank must first be built, so early tokenholders will see their investment capital immediately fund four key elements: the balance sheet of the bank (~80% dedicated to meeting stringent Tier 1 liquidity requirements), obtaining the banking licence, the build of the bank, and the technical build of the blockchain based platform
- up to 80% of investor capital will be legally ring-fenced as Tier1 Capital in an escrow account that can only release when the bank licence has been approved; effectively serving as collateral for the bank this allocation method offers an added benefit that in the unlikely event the application is unsuccessful, a majority of the investors' capital may be recovered
- while the banking licence is likely to take between 18 months to two years to obtain and investors should expect to hold their tokens for at least that long, the reward will be proposal and voting rights over the foundation, which will be established with a controlling interest in a for-profit bank.

Combined, these contingencies distinguish Valhalla Network from the majority of start-ups where from the outset, investors bear the risk of losing 100% of their investment.

Why this mission? Why do this with a bank? Because today's institutional banking model no longer meets the needs of our modern economies. The incentives are all wrong. Banks should exist to serve the communities in which they reside, but big banks simply do not and are increasingly centralised and disconnected. They are supposed to protect and diversify the economy by providing credit to small and medium enterprises (among other pro-growth functions), but they have withdrawn these facilities in favour of big businesses to maximise profits.

It matters what banks do with the money they manage and create, especially given the size and scale of modern financial institutions. Big banking moves national economies and their unilateral policies increasingly destabilise rather than promote growth. Current policy suggests that big banks and the central banks that control them are ignoring their role & responsibility in our economy's health - today's incentives are at odds with their original mission.

Valhalla Network envisions a better path.

Contents

1 Problem Statement

Modern banking is fundamentally misunderstood. Banks are not financial intermediaries as is widely believed, but actually creators of credit. Every time a bank extends a loan, new credit is created out of nothing. This extraordinary power of credit creation shapes entire economies, yet the extent of this impact remains largely unrecognised. The direction in which banks create credit actually influences which industries thrive or fail, with negative as well as positive consequences to a nation's economic growth.

Despite being the backbone of most economies, small and medium enterprises (SMEs) are under-served by today's increasingly centralised banking system. In many nations, SMEs account for approximately two-thirds of total employment and over 90% of businesses. Yet, as banks consolidate and grow in dominance, they have in reality drastically reduced lending to SMEs. Empirical evidence shows that large banks now prioritise lending to other large corporations and speculators (where they might also have indirect shareholdings), rather than to productive business investment that can drive growth across communities and economies.

In the current economic model, this puts SMEs under pressure as they often rely heavily on bank lending as their main source of liquidity and working capital. With increasing restrictions to alternative sources of financing and limited access to capital markets, bank credit remains critical for SMEs to survive and grow. Despite this, a staggering $5 trillion global credit gap exists for SMEs, and constrained access to affordable credit from major banks ultimately stifles SME growth, innovation and job creation.

Surveys show that SMEs require relationship banking and tailored services and want personal interactions with bankers who understand and can track their evolving business needs. Large, detached and/or centralised institutions do not currently offer this, so the need for community banks is clearer than ever. Large, institutionalised banks continue to prioritise large transactions and disproportionate profits over building relationships with small businesses.

It has become self-evident that this broken system is contributing to recurring boom/bust cycles and is misdirecting a growing percentage of credit into asset speculation rather than into productive investments with potential for sustainable and recurrent growth. The solution is to democratise finance by re-localising banking itself. Just as SMEs are the backbone of local economies, community banks must again become the backbone of banking. This will properly align incentives to channel credit for public good rather than just shareholder return.

Valhalla Network aims to transform finance and lending by establishing a global network of community banks. These banks will serve SMEs and local communities as their primary mission. By localising banking, Valhalla Network will help redirect the extraordinary power of credit creation to where it can do the most economic good.

2 Solution

Our mission is to create a global network of community banks that are governed by and work for the communities they serve. These community banks will focus on lending in their local areas, addressing the significant credit gap that exists and supporting businesses that are overlooked by larger banking institutions. Our goal is to help redirect the extraordinary power of credit creation to where it can do the most economic good, by unlocking credit and working capital for SMEs to foster sustainable economic growth.

How does this work in practice: Credit creation can be categorised as either non-GDP credit or contributing to GDP, depending on its purpose.

- Non-GDP (financial) credit is always unproductive and does not result in economic growth. It drives up asset prices resulting in asset price inflation and boom-bust cycles
- GDP credit is productive or unproductive depending on its application:
    - If created for consumption, any nominal GDP growth it creates is inflationary (consumer price inflation) and results in minimal real GDP growth
    - If created for investment (such as when used by a small business to invest in new machinery to produce more goods which in turn creates new income streams that can be used to service and repay the credit), it is productive and creates real economic growth ie: nominal GDP growth without inflation. For the economy, repayment of the loan neutralises the newly created credit, resulting in zero net change to credit in circulation and thereby no inflation. In effect, new income streams generate sustainable economic growth such that productive credit creation results in GDP growth without inflation.

Germany serves as an excellent example of a high output banking system designed to support small businesses. With over 1500 community banks known as Sparkassen, Germany has empowered local lending to small businesses, unlocking investment and growth opportunities that are often unavailable to the majority of small businesses in Europe. This decentralised banking system has contributed to Germany's success in nurturing numerous "hidden champions", small businesses that are leaders in their niche sectors, and has made Germany a global economic powerhouse. These banks provide personalised services by local bankers who build strong relationships with SMEs. Notably, during the 2008 crisis, not a single community bank in Germany required a taxpayer bailout.

The following chart shows some evidence for the UK that *the smaller the firm, the more likely it is to use borrowed money for productive purposes* like investment in machinery, improved processes and higher-quality goods and services offerings. Accumulated data increasingly dispels the myth that SMEs are "higher risk" and points to this misrepresentation as a diversionary tactic to shut down proposals for productive lending. Large firms, although they also use borrowed funds for investment and capital formation, typically do so to a lesser extent.

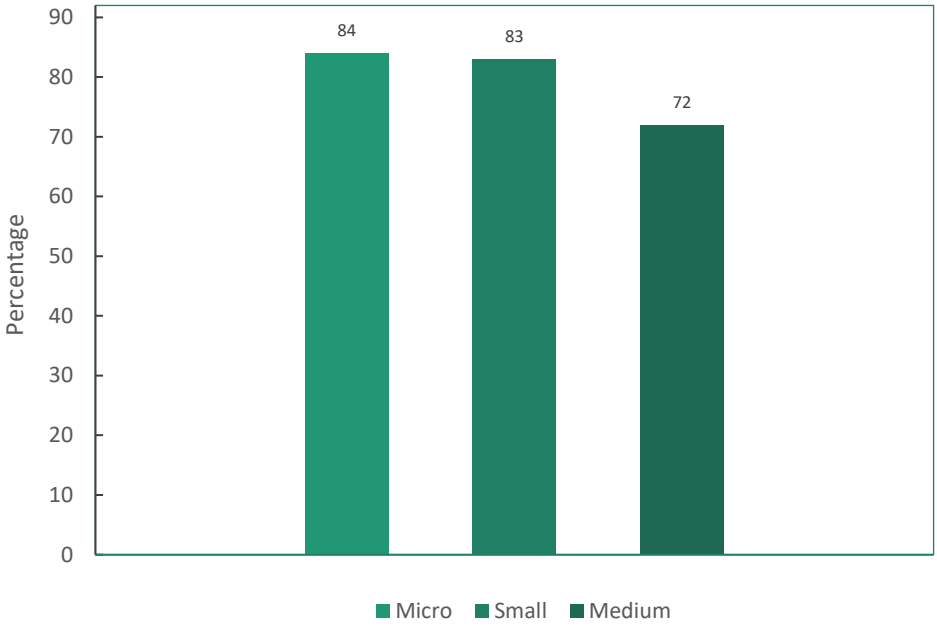


Figure 1: Use of external finance for investment, by borrower size.
No data available for large firms. Investment is the sum of capital used for: acquiring equipment or vehicles, or improving goods, services and/or processes.

Although non-bank financial institutions (NBFIs) can grant loans, only firms with a banking license (banks) can create new money. This extraordinary power comes about from banks being able to issue deposits and grant credit, without the need to segregate customer deposits or keep a matching amount of liquid funds for the deposits they have issued, thus allowing them to expand deposits by granting loans (Valhalla Network, 2023; Bank of England, 2014).

Valhalla Network aims to build on this highly successful banking model and, by ensuring it is SME-centric, will bring fair banking to countries and communities that have the greatest need for the solution - by establishing hundreds of community banks, Valhalla Network will re-localise the ”front-end” of banking.

This model goes an important step further and decentralises its governance framework by establishing a Foundation that is governed by a structure designed to enhance transparency and accountability, most similar in nature to a DAO. This approach helps to ‘democratise’ finance and amplify people’s voices to ensure the system serves them and their needs, rather than those of remote, self-interested parties.

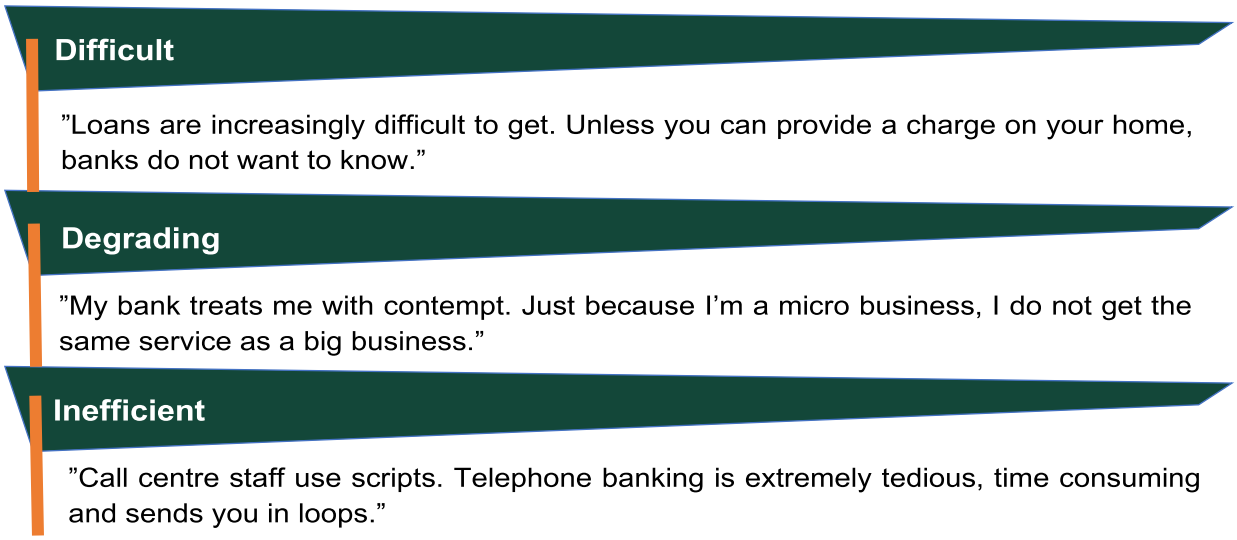
As we launch more community banks, scale-up costs will reduce as the network grows and benefits from shared IT infrastructure and start-up expertise.

3 Community Banks – Our Model

Valhalla Network's community banks will be established with local people, businesses, and the economy in mind. Each bank will remain small, approachable and geographically restricted to supporting SMEs in the local area - this limit to operational reach is to ensure bank staff do not exclude any local SMEs and work to create a variety of solutions capable of meeting a range of financial needs in their given area.

The bank will employ local teams to be 'on the ground' and build face-to-face relationships with businesses over time, forming mutual trust and developing a real understanding of the customers' needs. To forge a stronger bond between the bank and the neighbourhoods it serves, staff will also be encouraged to become active community members.

SMEs' feedback on the current UK banking experience



Valhalla Network community banks are very specifically designed to remain 'customer centric', offering dedicated relationship managers for clients to speak to and in-person meetings, preventing digital exclusion or isolation; this traditional relationship-led approach to banking is starkly different to the corporate disconnect seen with large and institutional banks who increasingly employ international and remote digital call centres and rarely, if ever, offer a face-to-face or personal banking experience.

Additionally, where SMEs are offered loans, they are increasingly forced to pay disproportionately high fees as banks endeavour to squeeze these businesses for additional profits; the fees are usually justified in complicated contracts and terms that are unfairly put on those seeking or in need of financial support.

3.1 The Community Banking Mission Statement

Valhalla Network community banks will strive to become the preferred banking partner for local SMEs by:

- Introducing an SME focused alternative to the competition
- Creating tailored banking services for small businesses
- Enhancing credit availability
- Offering attractive savings packages for depositors

By fostering strong relationships, each community bank will generate healthy and sustainable returns for both Valhalla Network Foundation and the respective charity foundation.

The mission of community banks is not to prioritise profit at the cost of the community; however, they are still quite profitable. We envisage each community bank will require 3-4 years to reach profitability as it connects with local businesses and expands its portfolio of relationships and accounts.

Each community bank will be partially owned by a local charity foundation responsible for reinvesting dividends back into local community initiatives and development programmes. This structure provides an opportunity for local representatives to be trustees of the charity foundation and so be actively involved in deciding how dividends will be reinvested into local initiatives, ultimately increasing local support for the bank.

In addition to the local foundation's integration within the community, we envisage the community bank engaging with local schools to offer 'financial literacy' education as well as apprenticeships and vocational training to teenagers and young adults. Potentially this could extend to start-up workshops to help guide and incubate next generation business development. The bank aims to be a hub for local economic growth.

3.2 Market Research

Across the spectrum, the smaller the bank, the lower their average various fees. This extends to consumer fees with a recent survey revealing that large banks typically offer far worse credit card terms and interest rates than small banks and credit unions, regardless of credit risk. The largest credit institutions were charging customers 8 to 10 points higher than small banks, and 3x more likely to charge annual fees (CFPB, 2024). Other studies show similar results when reviewing business fees.

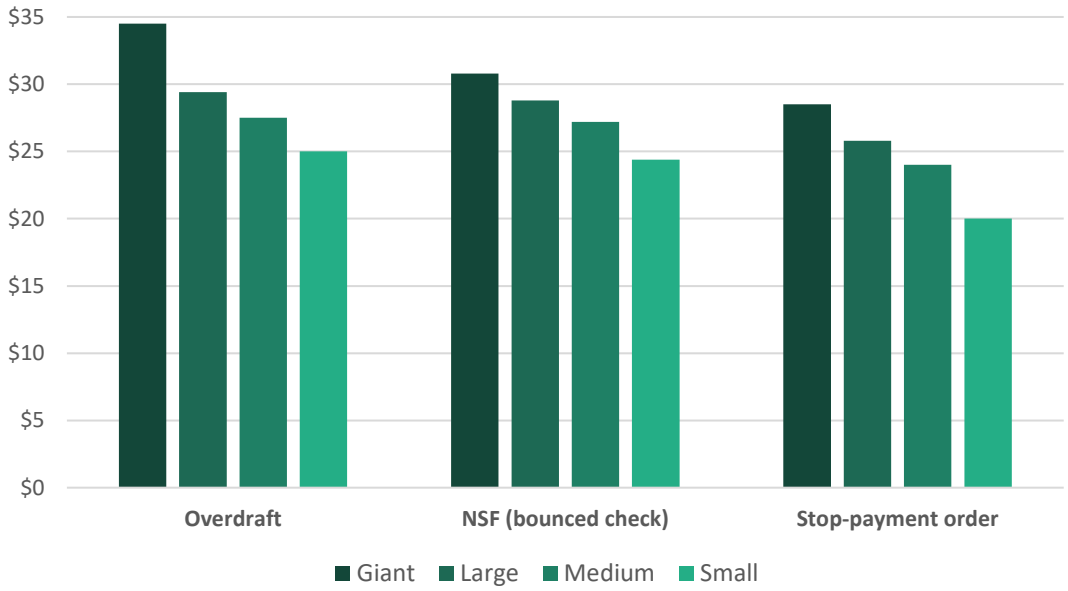


Figure 2: Average Fees by Size of Financial Institution in 2009
Source: Moebs Services
Notes: Data includes banks, thrifts and credit unions. Small institutions are defined as those with $100 million in assets or less. Medium are those between $100 million and $1 billion in assets. Large institutions are $1 billion to $50 billion in assets, and giant ones have more than $50 billion.

A recent SME survey conducted in East England highlighted a strong demand for banks that prioritise local lending and distribute a portion of profits back to the community.

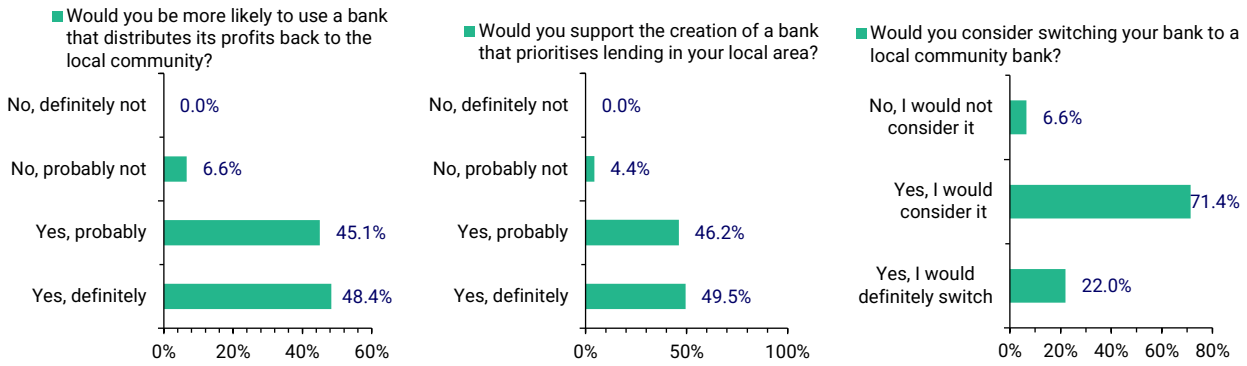


Figure 3: SME sentiment towards banks
Source: Local First CIC

Valhalla Network's community banks are each forecast to serve over 2,000 local small businesses within 5 years of being established. As small businesses are net job creators, it follows that after 10 years each bank will have created at least 5,000 local jobs and safeguarded many more. In line with Valhalla Network's commitments, each bank will recycle a portion of profits it generates within the community, boost employment and local economic growth, and, as described above, help combat inflation; in time these banks will create self-sustaining micro economies nationwide

3.3 Legal Structure of the Community Banks

This model is intentionally designed to be difficult to take over: ownership is split between 25% at local entity level and 75% under the Valhalla Network Foundation, which affords a level of protection and oversight beyond traditional corporate structures. The community banks will generate a positive cash flow for Valhalla Network Foundation, and thereby contribute to growing the treasury that will be under governance with a DAO-like structure. (Further information on governance is available in 'Foundation Governed by DAO').

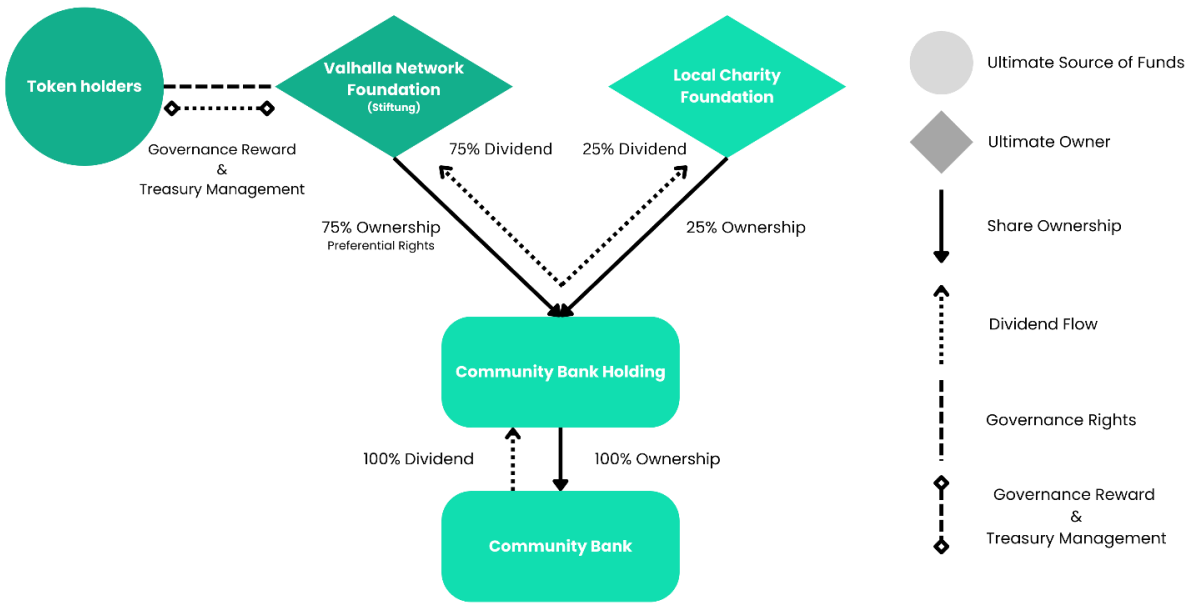


Figure 4: Community bank ownership structure

4 Anchor Bank

From a fintech perspective, it is important to acknowledge that community banks can take a few years to become profitable due to the nature of their business model and gradual, risk-adjusted portfolio growth. Compared to the wildly fluctuating web3 space where some investors expect a faster outcome, the underlying mission of this project demands a more long-term, steady approach if it is to succeed.

To meet investor expectations without putting the project at risk, Valhalla Network will work towards fulfilling its mission in two phases:

1. **Phase 1** is the establishment of a specialised bank; its purpose is to act as the anchor bank for the entire network, generating profits much sooner than a community bank due to its highly efficient proprietary business model. This will be the primary source of cash until the community banks become profitable.
2. **Phase 2** is the establishment of the community banking network that will gradually grow and generate additional returns for Valhalla Network Foundation.

Contrary to traditional banking models, the Anchor bank is designed as a highly profitable yet low-risk capital generating “engine” that can combine higher returns with a buffered financial model. It can immediately begin generating returns for Valhalla Network and has the potential to achieve an average return-on-equity (ROE) of 41.6%, which is significantly higher than market average. The real-world cash flows generated from this translate into a forecast return-on-investment (ROI) for Valhalla Network Foundation which is expected to achieve an estimated 5-year ROI of over 565% on Valhalla Network’s initial investment into the Anchor bank. We forecast the Anchor bank to begin operations shortly after our token generation event (TGE) in H1 2025.

The core aim of Phase 1 is to support the Foundation in its infancy with early cash flows; acting as a powerful economic pump it will propel Valhalla Network into Phase 2. This phased approach allows us to establish more community banks earlier than if we immediately started Phase 2 and relied on community banks alone. As a direct result we will be able to start rewarding the DAO community tokenholders sooner for active participation in governance, and critical decision-making in the distribution of profits, including funding of mission costs and development.

The Anchor bank’s design was inspired by Prof. Richard Werner using his 30+ years’ experience studying the inner workings of international banks to create a highly efficient, low risk model. The business models of both the Anchor bank and the community banks have been carefully formulated to ensure they pass the scrutiny and testing of the national competent authority (NCA), who will test all areas of the business plan, financial model, stress tests, disaster recovery, continuity plans and other areas of the business.

The start-up team has to evidence through stress-tests that the business model is robust enough to survive improbably harsh market conditions. Essentially, the banking licence will not be granted until the NCA is confident that the model and the bank can achieve and sustain profitability. Given the proprietary nature of this business model and the core IP it represents in this project, it follows that the details of the Anchor bank must remain limited to the purview of the NCA.

Our forecasted anchor bank metrics are below[1]:

	Year 1	Year 2	Year 3	Year 5	Year 10
Texas Ratio	7.73%	8.57%	8.12%	8.23%	7.28%
Book Value / CHF M	83	223	393	767	2,232
Capital Subscribed / CHF M	75	175	275	375	375
Dividends paid to the Foundation / CHF M	0	5	13	43	172

Table 1: The Texas Ratio assesses a bank's financial position by calculating the ratio of non-performing assets by the sum of the bank's tangible common equity and loan loss reserves. A ratio above 100 means the bank might need to cover potential losses; a low Texas ratio means the bank has sufficient reserves to cover potential losses.

Generally, the more tier 1 capital a bank holds, the more profitable it can be; therefore, we envisage returns to increase as the bank grows and accumulates capital.

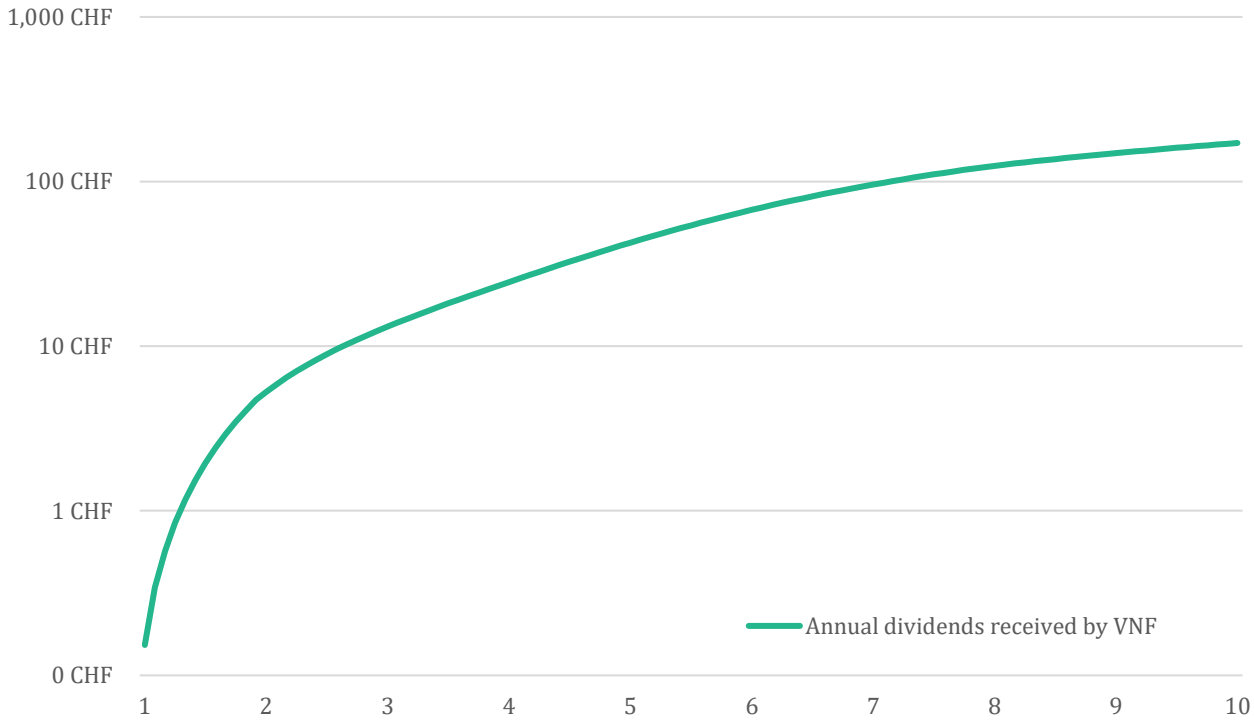


Figure 5: y-axis (CHF m per year), x-axis: time since authorisation of Anchor Bank (years)

The total value of the Foundation will be a combination of the underlying cash flows, any premium from the distributed ledger ecosystem, the intrinsic value of bank licences (the licence to treat customer deposits 'on balance sheet' and issue newly created deposits), and the public good done by the organisation.

[1] As the anchor bank matures and provides increasing returns, we envisage the DAO will vote for the Foundation to inject additional funds yearly to further increase returns.

The value of the distributed ledger ecosystem depends on the number of governance tokenholders, their distribution, and the activity of its members, among other factors. Generally, the larger and more decentralised the community, and the more commitment it applies to decision-making, the more valuable the ecosystem becomes.

The value of public good includes:

- Overall ability of the mission to effect positive change
- Future expansion and development plans including the establishment of community banks in developing countries as well as larger charitable projects funded by the Foundation
- Positive impact of the project including reinvestment back into local communities (tracking also ESG, UN SDGs, and equivalent metrics)

Despite the forecasted strong returns generated by the anchor bank, it is worth noting the financial model contains built-in buffers and higher than forecast loan provisions. Examples include:

- Cost of funding (set considerably higher than achievable)
- Return on assets (set significantly lower than achievable)
- Start-up costs are budgeted to consider all eventualities
- Across the portfolio, probability of default and loss given default (LGD) are set higher than risk ratings suggest

The banking sector is one of the most regulated industries with authorities setting, regulating and auditing how banks manage their risk. The regulators set several ratios the Anchor bank must meet (such as liquidity coverage ratio, leverage ratio, CET1 ratio, and others) - our model not only meets these ratios but far exceeds them. It is worth noting that as the Anchor bank will be majority owned by Valhalla Network Foundation, and the remaining 25% assigned to staff options and other shareholders, the only qualifying shareholder will be the Foundation.

4.1 Legal Structure of the Anchor Bank & Foundation

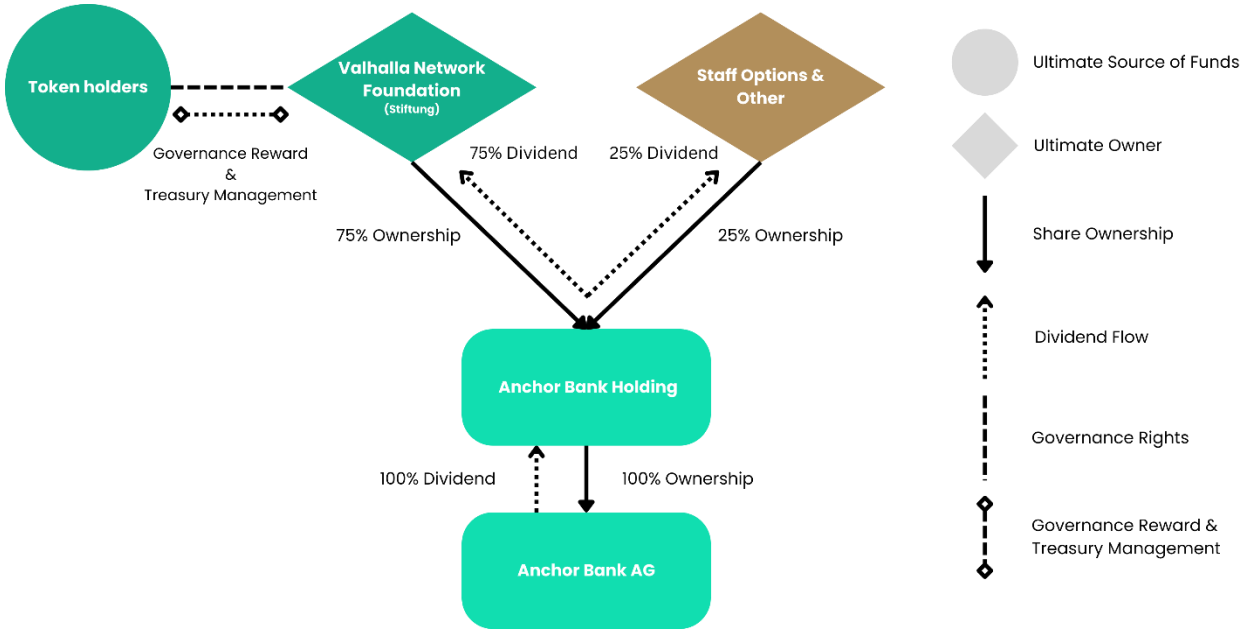


Figure 6: Anchor bank ownership structure

It is crucial to note that, like as with any bank shareholder, the Foundation will own but not manage any of the banks in the network. Each bank will be a stand-alone legal entity with its own balance sheet, and will be managed individually by locally-based, experienced senior bankers who are required to pass regulatory interviews. These bankers will manage day-to-day operations with a regulated board of directors to provide oversight. At no time will there be undue influence from any shareholder on the bank itself. *See Governance for further information on DAO governance of the Foundation.*

The jurisdiction's forward-thinking approach to crypto regulations, particularly with the upcoming adoption of MiCA, aligns well with our intended legal structure. By establishing both the Foundation and our Anchor bank in the same jurisdiction, we are able to streamline applications under the same jurisdiction and the same legal team; this avoids us having to interface with multiple regulators cross-jurisdiction, potentially leading to a faster and more cost-effective path to obtaining the necessary license. Lastly, the jurisdiction has forged strong relationships and ties with influential neighbouring countries making it the ideal centre for our Anchor bank.

5 Valhalla Network DAO

Since the mission is to democratise finance, Valhalla Network will operate with a structure akin to a decentralised autonomous organisation ('DAO') - an emerging legal [corporate] structure with a distributed control & governance mechanism [instead of a central governing body such as a board of directors], whose members share the common goal of acting in the best interest of the project, and where smart contracts are used to ensure transparency of operations and decision-making.

Contrast this with a traditional company and its hierarchical structure, where a CEO or board of directors make important decisions that can be subjective when compared to the wishes or interests of other stakeholders. While this structure often works, it has its limitations and can be vulnerable to lobby, influence and takeovers.

The evolution of this is the DAO, which has been purposefully designed to distribute voting controls and responsibility to the stakeholder community, effectively 'democratising' the processes of review and decision-making. The effect is that stewardship and accountability become central to the operating structure which significantly reduces the risk of its mission being undermined or derailed by self-serving decisions or external forces. In a DAO, governance of the organisation is open to all who are committed to the success of its mission. This interest is gauged by the number of tokens the person has, and simply owning tokens grants the ability to propose ideas, discuss them openly with other holders, and then vote on the decisions that result in formal governance actions.

Similar examples exist in the form of co-operatives, however a DAO offers added technological advantages through use of the blockchain which introduces a quantum leap forward in transparency, security as well as the removal of geographical boundaries.

How does Valhalla Network benefit from this structure?

- **Distribution of control:** Valhalla Network stands opposed to the highly centralised banking system currently in operation - a DAO structure is inclusive of all stakeholders, offering a voice to anyone with an interest in its mission and operations
- **Transparency:** Everything governed and effected on behalf of the stakeholders remains in the open, visible and recorded for all to see, ensuring all stakeholder's interests are protected
- **Resilience:** Decentralised nature of DAOs assures durability and persistence; with no centralised power structure to undermine, single points of failure are all but eliminated

In summary, to succeed in its mission to re-localise banking and decentralise finance, Valhalla Network is being built to last, ensuring it can deliver on the vision of a global network of self-sustaining and self-replicating community banks.

It is worth noting that governance by large groups of incentivised stakeholders quickly improves performance, however it can be equally slow and a drag on the DAO - for this reason, and to fulfil various legal and regulatory requirements, we will establish a Foundation empowered to operate in real time on behalf of the DAO.

6 Foundation Governed by DAO

Valhalla Network will be working in one of the most regulated business sectors and a number of stringent legal requirements must be incorporated in each bank's structure to secure and maintain approvals to operate. For example, an active local holding company will be set up in each of the jurisdictions to provide a degree of separation between 'shareholder' and 'bank'. The majority shareholder, Valhalla Network Foundation, shall have oversight of all operations.

As this Foundation will be accountable to highly regulated industry standards, there are a number of facts to make clear about the relationship between the token community and Foundation.

The Foundation Must Operate Within the Law: Backstops must be in place to protect stakeholder assets and the operations of the Foundation from a potential risk that DAO governance voting mistakenly places the Foundation in a legally compromising situation. For example, actions that are accepted in one jurisdiction might not be legal in another and time for review by local experts must be embedded in the approval process. Equally, undue influence could emerge which could put the Foundation at risk. The Foundation will employ a Council to ensure the will of the DAO is in accordance with the law. While the Council shall remain subject to elections and recall through DAO governance, it will carry the legal responsibility to ensure votes that pass are in accordance with local laws. For full transparency and to provide opportunity for revision, the Council will provide detailed reporting on its reasoning along with guidance and, as appropriate, alternative proposals.

Real Time Problems Must Be Handled in Real Time: DAO governance is not suited to reacting in real-time, as well-crafted governance can take days, weeks, or even months to develop, publish and vote into being. Accordingly in addition to the Council, the Foundation will also empower various committees and appointees to act on the DAO's behalf on matters that require less statutory (Council-level) review but would benefit from faster processing. Under contract, any authority granted to these committees and appointees will be strictly limited to the by-laws that assign the scope of their purview and shall not supersede or supplant the authority of the Council. Examples would be: physically signing documents on behalf of the Foundation when setting up a new community bank or, reacting to ensure KPIs related to tokenomics are correctly managed. Where the Foundation needs to act quickly, or physically, the executive team with delegated authority can step in.

The DAO Does Not Govern Bank Activities: In each of the jurisdictions where a community bank is established, an active local holding company will be set up that will govern the bank's operations in accordance with applicable regulations. To ensure the operations of the Foundation and Bank remain legally separate, Valhalla Network Foundation will have a 75% stake in each Bank holding company, affording it the benefit of owning and receiving dividends from that holding company but without directly controlling or interfering with the running of the local bank entity.

6.1 Governance

Valhalla Network's governance process consists of four distinct phases:

1. Discussion by token community and creation of formal proposal
2. Token community vote
3. Council vote (if required)
4. Execution

Discussion and creation: The purpose of this stage is to discuss and refine proposals to help the community understand whether it is worthwhile a formal proposal and on-chain vote taking place. At this point all tokenholders can and should engage in debate and contribute to the formulation of proposals.

Through use of a dedicated forum within the technical platform, a governed ruleset will foster productive exchanges. At this stage, the number of tokens a holder owns does not determine their level of influence, as each participant is granted a single vote on the promotion of draft proposals that ascend to becoming a formal proposal. This keeps the conceptualisation phase of the governance process to a conversation between equals. Each tokenholder has a voice, with the ability to comment on and refine proposals, which aims to foster a collaborative and inclusive decision-making process. This phase of governance concludes in an informal poll .

Token community vote: After it has been decided that a formal proposal should be created, a select group of authors convert the forum proposal into the necessary format for a vote. These authors will be subject to governance by-laws, and initially consist of team members that will likely grow to include contributors. Each proposal will include a reference to the discussion that initiated it.

Council vote: Proposals that impact the onshore entity, requires non-chain execution, or which carry a heightened risk (regulatory, legal, financial, or otherwise) shall be put forward to the Foundation's Council following a successful tokenholder vote. In the majority of cases, the Council is expected to agree with the tokenholder vote and pass the proposal; however, cases where the Council has identified a serious risk, they will veto and return it to the token community with a comprehensive report, as described previously. This second layer of voting acts as a firewall to protect all stakeholders' interests.

Execution: How the proposal is executed depends on whether or not it affects on-chain assets:

1. For proposals that affect on-chain assets:
   The proposal's structure will include execution instructions. Upon a passing vote, the execution phase begins, which includes a verification step to ensure the proposal as written actually passed.

2. For proposals that do not affect on-chain assets:
   Execution follows whichever path is required to ensure the proposal takes effect. For a community bank proposal, it will initiate the work required to create that bank; for a by-law change, this would involve updating the by-laws. This form of governance creates an obligation for the executive team, the Foundation Council, and for wider stakeholders, and requires the inclusion of success criteria, so the proposal's status can be updated appropriately when the execution is complete.

To ensure smooth and successful operations and effective control of the Foundation, Valhalla Network will need to bootstrap its governance. The start-up team has created by-laws and statutes prior to the launch of the token, with the understanding that any such by-laws are themselves subject to governance by the DAO. This proactive measure gives the project a solid governance structure right from the start, while ensuring Valhalla Network tokenholders retain the ability to shape the governance structure through active participation.

The Foundation, which operates as the bridge between traditional, onshore corporate infrastructure and decentralised finance, must strictly adhere to legal and regulatory requirements. While the governance decisions of the DAO hold significant and primary weight, the Foundation's Council retains the authority to overrule tokenholder proposals based on legal and regulatory considerations. Crucially, any intervention by the Council in the governance process will be executed with utmost care and sensitivity. The Council's participation throughout the governance process is intended to prevent situations where emergency intervention becomes necessary, as open conversations about legality and regulations should occur during the draft phase, prior to formal governance proposals. There may be exceptional cases where even with the best of intentions and guidance, Council intervention is still required to safeguard the interests of the DAO, the Foundation, and Valhalla Network. To ensure transparency and accountability, the Council will be required to provide timely and comprehensive reports, outlining the legal and regulatory reasons behind any decision to overrule a proposed governance action. This reporting mechanism further serves to maintain

the integrity and interests of the DAO, the Foundation, and Valhalla Network and ensures governance operates within legal boundaries without compromising the principles of transparency and accountability.

6.2 Execution and Day to Day

A unique interdependence between the DAO and the Foundation is the cornerstone of its operating framework. The DAO helps govern and guide the network's decision-making processes and growth of the network, while the Foundation assumes legal responsibility.

- The DAO serves as the driving force behind Valhalla Network's decision-making processes and is where proposals are conceived, evaluated, and ultimately voted upon. Proposals encompass a wide range of action and changes, from updates in network by-laws to strategic decisions that shape the future of Valhalla Network. Through a transparent and democratic voting mechanism, the DAO ensures every member's voice is heard, fostering an environment for reaching consensus
- The Foundation, established as a legal entity in Lichtenstein, assumes a critical role in the network's operational structure. Governed by statutes and by-laws, the Foundation works with the DAO to fulfil the mission. Its Council oversees day-to-day operations, ensuring the proposals put forward by the DAO are effectively implemented. This oversight extends to regulatory compliance, legal obligations, and safeguarding the interests of both the Foundation and the DAO
- Various committees within the DAO governance structure can support the Foundation in its endeavours. These committees will have specific purposes, each focused on a single mission that aligns with or advances Valhalla Network's objectives. For instance, a committee may be tasked with supporting the launching a community bank, while another may oversee the remuneration of the executive team. These committees will function with defined objectives, adapting to the evolving needs of the network
- Additionally, the Foundation can employ authorised specialists who possess expertise required for specific purposes or missions. When there is a need for an on-demand response, it might not be feasible to demand a DAO decision; this is where these individuals can bring dedicated focus and help the DAO and Foundation provide solutions or execution in real time

7 Risk Assessment and Modelling

As with any business, Valhalla Network is subject to a number of risks, each of which has been extensively assessed and where appropriate, stress tested, as each component part of the model was developed. Each consecutive stage of the development process has included the following:

Initial setup:

- Technical Risks (IT, data integrity, outsourcing, etc.)
- Business Continuity Risks
- Legal, Regulatory & Compliance Risks (including financial crime)
- General Risk (governance, data, conduct)
- Climate & Environmental Impact Risk
- Reputational Risk
- Competition Risk

Development of the Anchor Bank:

- All of the above
- Macroeconomic Risk

- Market Risk
- Liquidity, Capital, and Funding Risk
- Trading & Pricing Risk
- Foreign Exchange Risk
- Operational Risk
- Fraud Risk (internal and external)

While some aspects of the modelling process remain proprietary and the purview of regulatory authorities, detail may be made available to investors, upon request.

8 Incentives and Behaviour

Governance of a DAO requires ongoing attention and effort to ensure sustained operation, and the need for meaningful participation in its governance is paramount. To this end, the incentive structure of Valhalla Network's DAO is designed to encourage active and informed governance participation.

One key aspect of incentivised participation in Valhalla Network's governance is the introduction of a governance reward mechanism. Tokenholders are given the opportunity to lock their tokens for specific time periods. By doing so, they become eligible to receive rewards based on their meaningful engagement in governance activities. This engagement is measured by the number of votes cast, but may also extend to the active participation in governance discussions and the creation of impactful governance proposals.

The allocation of the budget for governance rewards lies within the purview of the DAO itself. This approach allows the DAO to adjust the reward mechanism based on the evolving needs of the network. It ensures that incentives remain effective and adequately aligned with the network's goals.

To perpetually fund these incentives, Valhalla Network incorporates a mechanism for reacquiring tokens from the market. This ensures that the necessary resources are available to sustain the governance reward program over time. The mechanics of this reacquisition system are implemented through smart contracts, which enable tokenholders to regularly exchange their Valhalla Network tokens for Ether or other currencies deemed suitable by DAO governance. By maintaining a balance between providing meaningful incentives and offering an exit option for holders, this mechanism sustains the reward program while accommodating individual liquidity needs.

9 Fundraising and Token Details

Valhalla Network will have a single circulating ERC20 utility token, issued on the Ethereum network and bridging to other networks as necessary. These utility tokens will primarily serve the purpose of providing governance rights to Valhalla Network DAO. The total number utility tokens will remain capped at 4 billion. *See 9.2 Phase 1 Fundamentals for more detail*

9.1 Early Funder Protection

Our project stands out among many start-ups due to its controlled downside risk. We anticipate 'spending' only 20% of the total private investment we raise, while assigning the remaining 80% as Tier 1 Capital. This allocation effectively serves as collateral for the bank.

In the event that Valhalla Network is unable to obtain a banking licence and, after exhausting all contingency plans, decides to wind up the project, a significant portion of that capital could still be available and be returned to investors. This aspect distinguishes us from the majority of start-ups where from the outset, investors bear the risk of losing 100% of their investment.

9.2 Phase 1 Fundamentals

The 80% of capital securely held in reserve will be exclusively allocated as common equity tier 1 (CET1) for the Anchor Bank in Phase 1. Valhalla Network will use the remaining funds, excluding the funds dedicated to banking capital, towards the development of the protocol and the preparation of the bank for its operational phase.

The setup and launch of the for-profit Anchor Bank will take approximately 18-24 months from the initial date of the private sale. This timeframe encompasses various tasks such as establishing the Foundation and banking entity, implementing the technical solution, and applying for and obtaining a banking licence.

Rather than typical DAO staking, tokenholders can receive governance rewards as described earlier. These will start with an Annual Percentage Rate (APR) of 5% which will be available to circulating tokens and locked investor tokens; the start-up team relinquishes their rights to receive these rewards while their tokens are locked. Valhalla Network will replenish the governance rewards using the reacquisition strategy described previously. The DAO will have the flexibility to adjust the APR to align with market conditions and meet the incentive requirements.

There is a maximum of 4 billion mintable governance tokens. The breakdown of the total governance tokens is illustrated in the chart below:

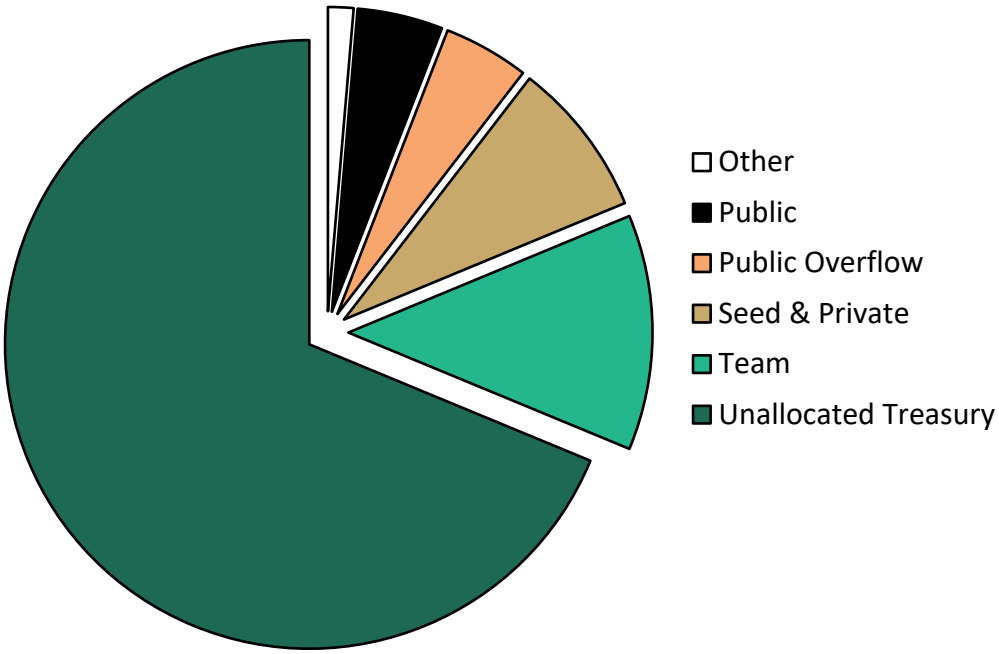


Figure 7: Breakdown of total governance tokens
The Valhalla Network Treasury is unallocated tokens to sustain future public sales, governance participation rewards, community initiatives, partnerships, and adverse market conditions. All of these are controlled by the DAO, and bring the benefit of increased decentralisation as tokens are sold or distributed. Other includes: Dex liquidity, developer costs, initial governance rewards.

The primary function of the unallocated treasury tokens will be to raise capital, with secondary functions including governance rewards, contingency funds and other needs as governed by the DAO. The Team Category includes all tokens held by both the start-up team and the advisors.

Token Distribution	**%**
Unallocated Treasury	68.8
Team	12.5
Seed & Private	8.3
Public	4.6
Public Overflow	4.6
Other	1.4

Table 2: Distribution of tokens
Unallocated Treasury will gradually be distributed to the community at future fund raises

9.3 Phase 2 Fundamentals

Once the Anchor bank has been established, Phase 2 can begin. In Phase 2, Valhalla Network will begin creating a network of community banks, focusing initially on markets with a similar regulatory environment or with the greatest need. To raise capital for community banks, the Foundation will unlock and sell governance tokens from the unallocated Treasury.

During the establishment phase of the community banks, the Phase 1 bank will generate growing cash flows to support the Foundation and tokenholders. Over time, a consistent influx of new community banks will become profitable, resulting in a fully self-sustaining system.

9.4 Vesting

The start-up team and advisors to the Foundation will receive tokens to support and ensure a vested interest in the Valhalla Network community. These tokens will be fully vested for 24 months after the token generation event and then released at a rate of 4.2% per month until TGE+4 (Token Generation Event + 4 years). Four years after the token generation event, all tokens will be unlocked.

Both seed and private sale tokens will follow similar vesting conditions as the start-up team's tokens, except they will unlock 12 months after the token generation event at a rate of 8.3% per month until TGE+2.

Tokens sold to the public during the public sale will be locked during the sale, and become immediately available after the establishment of the liquidity pool by Valhalla Network.

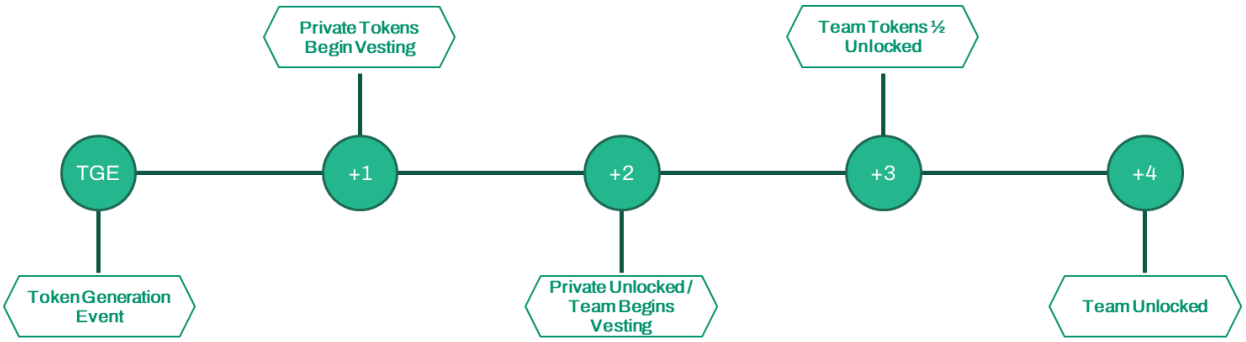


Figure 8: Token vesting timeline (years after the token generation event)

9.5 Use of Funds

Valhalla Network aims to secure seed capital for the establishment of the first-ever bank in the Eurozone designed with a governance structure akin to that of a DAO, along with obtaining regulatory approval and commencing operations. Following this crucial Phase 1, Phase 2 will immediately lead to the creation of a global network of community banks dedicated to providing support to small and medium-sized enterprises (SMEs) and local economies. To provide investor protection, a significant portion of the funds raised, exceeding 80%, will be held for the Anchor bank's capital requirements. If Valhalla Network fails to obtain a banking licence, these funds can be returned to the investors as part of their safeguard.

Fundraises are forecasted as follows:

Seed: CHF 1m
Private 1: CHF 2.3m
Private 2: CHF 800k
Private 3: CHF 30m
Public Sale (close to regulatory approval): CHF 50m

9.5.1 Use of Private Raise

While funds raised to date were allocated for pre-development and analysis costs, the majority of Private 3 is reserved for Tier 1 Capital.

Use of Funds	Assigned Funds (CHF)
Collateral (reserved capital)	24,000,000
Bank Setup Costs	4,800,000
Total Regulatory Bank Equity	**28,800,000**
Total DAO Costs	**1,200,000**

Table 3: Use of Funds

Valhalla Network will initiate the development and establishment of the DAO. Simultaneously, the team will develop the bank's IT systems, finalising bank procedures, and obtaining the necessary bank licences and certifications. Essential contracts will be secured for senior banking management, responsible for overseeing the bank's day-to-day operations and ensuring sustainable returns for the Valhalla Network community. These contracts will also encompass the administrative requirements of the bank.

9.5.2 Use of Public Raise

As the approval for the bank licence draws closer, Valhalla Network will conduct a public sale, offering 180 million governance tokens to raise CHF 50 million. The majority of the amount will be added to the anchor bank's CET1 capital, thereby providing additional capital for the bank to commence its operations.

Roughly CHF 5m will be used to provide DEX liquidity. This involves the purchase of CHF 5m Ethereum with the equivalent value of Valhalla Network governance tokens to establish an initial trading price and a pool for buyers and sellers to trade tokens; this pool will grow in size as liquidity providers contribute.

The Public Sale will be facilitated through an open subscription model and a launchpool, ensuring broad accessibility. When the public sale completes, the governance token will be listed on a decentralised exchange. All tokens sold during the public sale will unlock for exchange.

Use of Public Raise	Assigned Funds (CHF)
Tier 1 Equity	45,000,000
Dex Liquidity	5,000,000

Table 4: Use of Public Raise Funds

10 Roadmap / Plan

High-level overview to date

Banking Application: The team spent the majority of 2022 researching and exploring different regulatory environments suitable for establishing both the Foundation and the anchor bank. Various factors were taken into consideration including jurisdiction and regulator reputation, time and cost involved, and the ease of doing business. Deciding on the right jurisdiction is critical to the overall success of the project. Through the end of 2022 to H1 2024, the team finalised preparation of the preliminary application documentation and drafting of the Foundation Articles of Association and bylaws.

Technical Development: Due to the banking timeline, the project has the luxury of an extended technical runway versus the majority of web3 start-ups. This provided us the time to complete thorough research into the requirements of the MVP and define its foundations before starting implementation. Towards the end of 2022, the technical team implemented a full governance system of integrated applications, allowing users to propose, vote, and execute governance changes that resulted on-chain; Valhalla Network's provisional test token, VNT, was used to weight votes. The design of Valhalla Network's token economy was fully completed in 2023 moving the technical team to the deployment phase and stress testing.

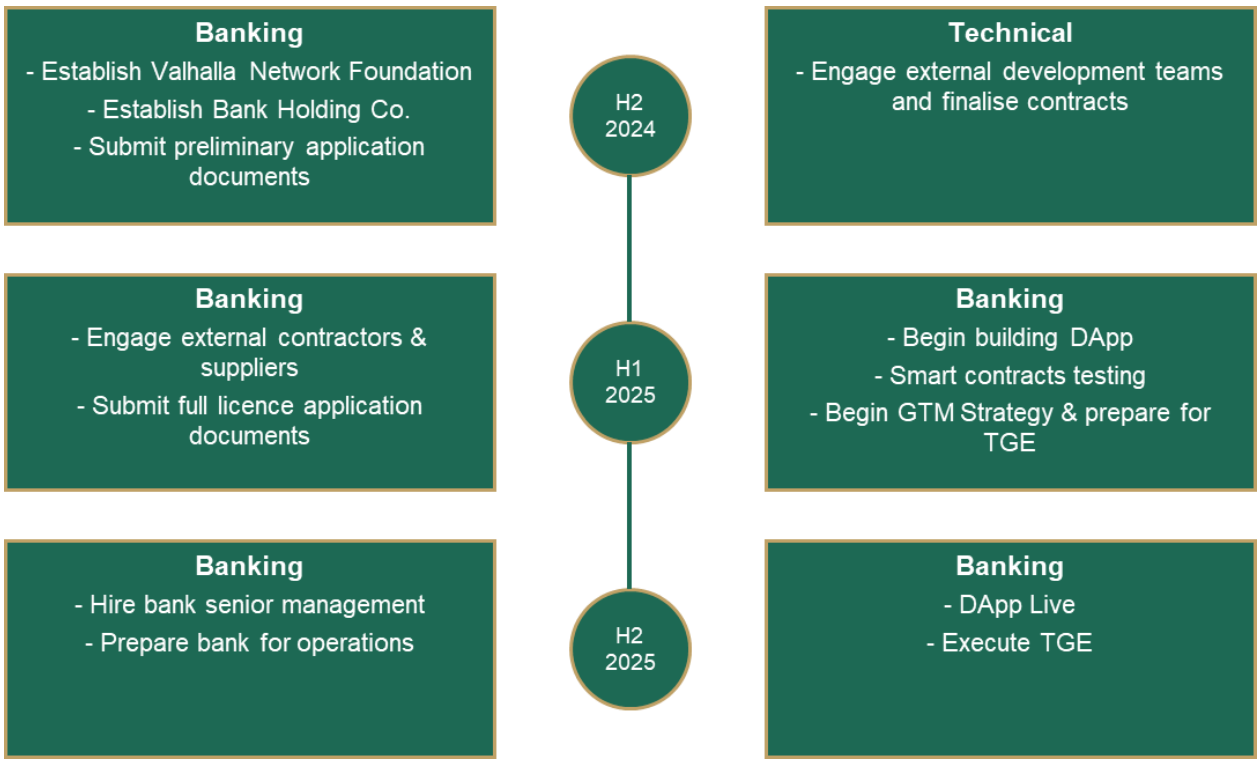


Figure 9: Valhalla Network Timeline

11 Team

Valhalla Network's overall responsibility is to deliver the plan as quickly and meticulously as possible in order to bring value to Valhalla Network's community and wider stakeholders. The day-to-day operations of banks within the network will be the responsibility of experienced senior management who will be headhunted, interviewed, and hired by Valhalla Network's team.

11.1 Executive Team

Oliver Studd

Founder

Mark Jolly

Head of Compliance

Mark Mottershead

Head of Marketing

Bence Csiszar

Associate

11.2 Valhalla Network Foundation Council

Aoun Sharaf

George McNee

Matt Gubba

Mark Jolly

Oliver Studd

12 Appendix 1 - The Financial System

Valhalla Network is a reaction to banking systems that fail the people and businesses who need them the most. We build our mission around the idea that banking can do better, but to understand what that means requires understanding what the modern, consolidated, too-big-to-fail banks are doing wrong. Banks are often found acting unethically, laundering money, and requiring government bailouts, and they are rarely held accountable. The pseudo-government central banks that regulate banks have power that isn't always clear, doesn't seem to make things better, and is never communicated well. In this section, we'll explain and prove why banks that act locally and engage with small and medium sized enterprises (SMEs) do a better job than overly large multinational banks. Valhalla Network. This section is the result of research that drives Valhalla Network's mission.

Many people misunderstand how banks work and the impact they have on economies. Even bankers at the largest commercial banks naively believe banks to be simply financial intermediaries, only moving money between 'depositors' and 'borrowers' to make profit on the net interest margin. This perceived role would make banks no different from non-bank financial institutions (such as investment firms). Banks are *different.*

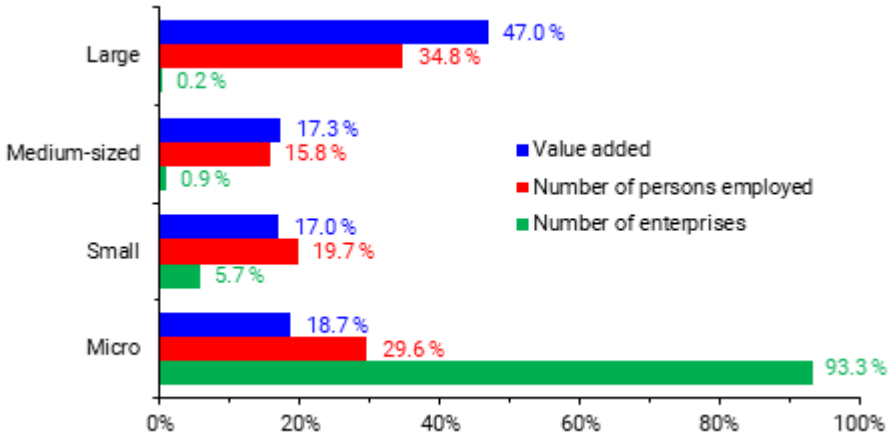
Banks are crucial for the vibrant growth of economies and survival of businesses. When banks extend loans they act as credit creators, and subsequently, when borrowers repay loans, banks act as credit destroyers. This process of credit creation fuels the economy, and when done responsibly, results in GDP growth. In contrast, when non-bank financial institutions (firms without a banking licence that loan funds to borrowers) lend to businesses, the 'investment' cancels out private consumption 1:1 resulting in zero GDP growth. This is similar to governments borrowing from private investors to fund their fiscal policy; by borrowing from private investors, government spending is cancelled out by reduced consumption. There is no credit creation in these two cases as only a bank can create new credit - banks create money out of thin air.

12.1 The Importance of Small and Medium-Sized Enterprises (SMEs) – SMEs' Economic Role

Today's globalised economies often seem dominated by large corporations, but this is far from true. In the European Union (EU), small and medium-sized enterprises (SMEs) with less than 250 employees:

- constitute 99.8% of all firms
- employ 75.2% of the labour force
- contribute to 53% of the gross value added of the total economy

The "typical European firm is a micro firm" (EIM, 2011, p. 5). Other countries are similar. In most OECD countries, SMEs account for 30−70 percent of value added, 15-50 percent of exports, 60−70 percent of employment, and a disproportionately large share of *new* jobs (OECD, 1997, p. 8).

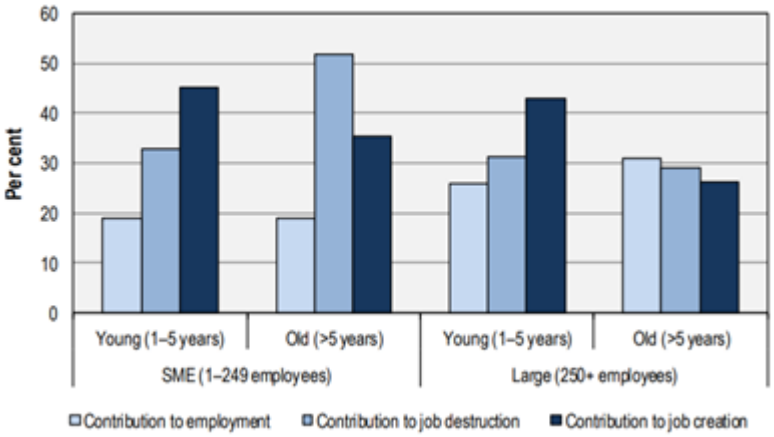


Share of large, medium, small and micro firms in value added, employment and number of enterprises. Data refers to EU27. Source: ICW, *SME Performance Review 2021.* https://ec.europa.eu/growth/smes/sme-strategy/performance-review_en

Perhaps most strikingly, SMEs are the biggest *net* job creators. According to the International Labour Office (2015, p. 9), young enterprises, especially young SMEs, "create a disproportionately high number of jobs". The report refers to SMEs creating more jobs than warranted by looking at their share of employment. And not only do they create more jobs*, they also destroy fewer jobs.* SMEs are therefore strong ***net*** job creators. The report adds that,

"Although young enterprises respond more strongly to economic upturns or downturns than old enterprises, they remained net job creators during the Great Recession of 2007–09. Most of the job losses were caused by contractions of mature businesses" (ibid., p. 9)

The following figure is taken from that same report.



Employment, job creation and destruction by enterprise age and size. OECD sample (2001–2011). Source: International Labour Office (2015, p. 10, Fig. 2.6).

Also, "young enterprises are less likely to survive than older enterprises, but the surviving young enterprises tend to have higher employment growth rates." (De Kok et al., 2011, p. 8). The second effect outweighs the first. Furthermore, fast-growing SMEs provide the bulk of job creation.[2]

[2] Enterprises mostly start as micro or small enterprises but might grow to become large enterprises. Few start-ups (2–9 per cent) grow above ten employees, but they make a substantial contribution to job creation, ranging from 19 to 54 percent. It is ultimately only a few enterprises that grow to become larger enterprises and generate most of the new jobs. These high-growth enterprises are often referred to as transformational entrepreneurs, graduate enterprises or gazelles, and they create vibrant businesses with jobs and income for others, beyond the scope of an individual's subsistence needs. In contrast, subsistence entrepreneurs usually do not grow, but provide income and employment for the owner of the micro-enterprise and his or her family (International Labour Office, 2015, p. 10).

	Net job creation per 1,000,000 population
Newly born enterprises	17.5
Young enterprises	0.2
Established enterprises	-4.2

Net job creation 2004–2010 by age group of enterprises that survived. Source: De Kok et al. (2011, p. 8). Based on Amadeus/Orbis, Bureau Van Dijk.

12.2 SMEs Depend on Banks

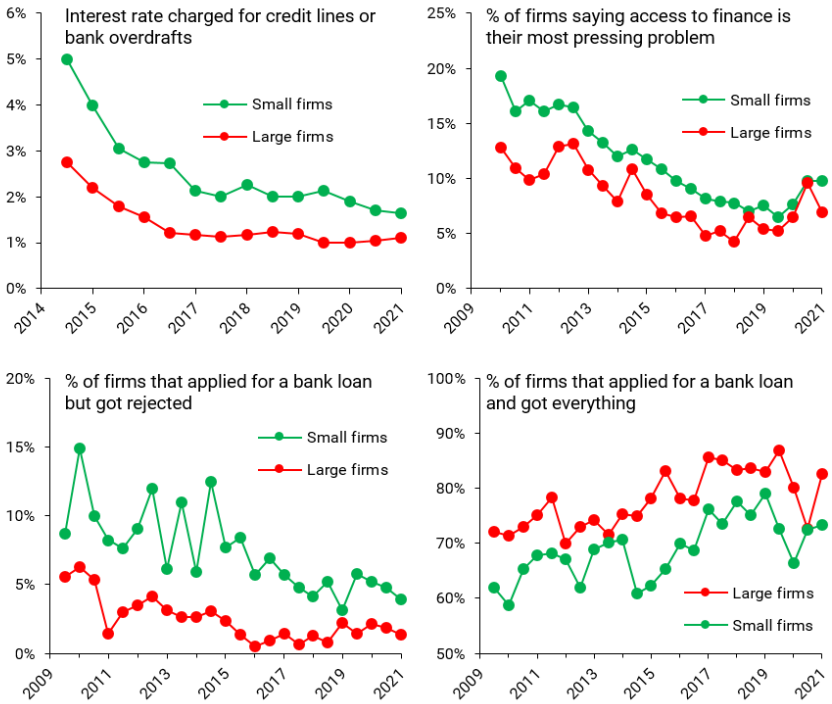
Getting external funding is not easy for SMEs. This is for various reasons. Unlike large firms, SMEs cannot access regulated capital markets at an affordable cost, for fees are much higher for small denomination issues (European Parliament, 2019, p. 2).[3] Being unable to access capital markets, SMEs turn to banks as their only alternative for external funding of substantial amounts (SMEs tend to borrow from family and friends, but the amounts tend to be smaller, naturally) (OECD, 2018, p. 10). But banks, like most lenders, typically ask for collateral to reduce the loss given default of the borrower (it is estimated that around 50–70% of loans to non-financial firms are collateralised), but unlike larger firms, SMEs often do not have good quality collateral to offer (Degryse, Karapetyan and Karmakar, 2019, p. 1; Beck et al., 2015). Banks prefer to deal with larger firms (OECD, 2018, p. 6; Brown and Lee, 2014, p. 9). To compensate for this, banks tend to charge SMEs higher interest rates (OECD, 2018, p. 8)[4] compared to large firms with better collateral or a longer credit history or a credit rating, and SME loan applications are more frequently rejected (European Commission, 2009).[5]

The next two figures tell this story visually using data for euro area banks and SMEs. As shown below, small firms (which are part of the SME sector) tend to be charged a higher interest rate compared to large firms, tend to cite access to finance as their most pressing problem more commonly, their loan applications get rejected more often, and when they get accepted, they tend to get everything they ask for less frequently.

[3] In the EU, companies wishing to raise capital on public markets through the issuance of shares or bonds have a choice between two broad categories of venues: regulated markets and multilateral trading facilities. Even though both categories are open to companies of all types and sizes, regulated markets have compliance requirements that render listing costlier and cumbersome for smaller firms (European Parliament, 2019, p. 2).

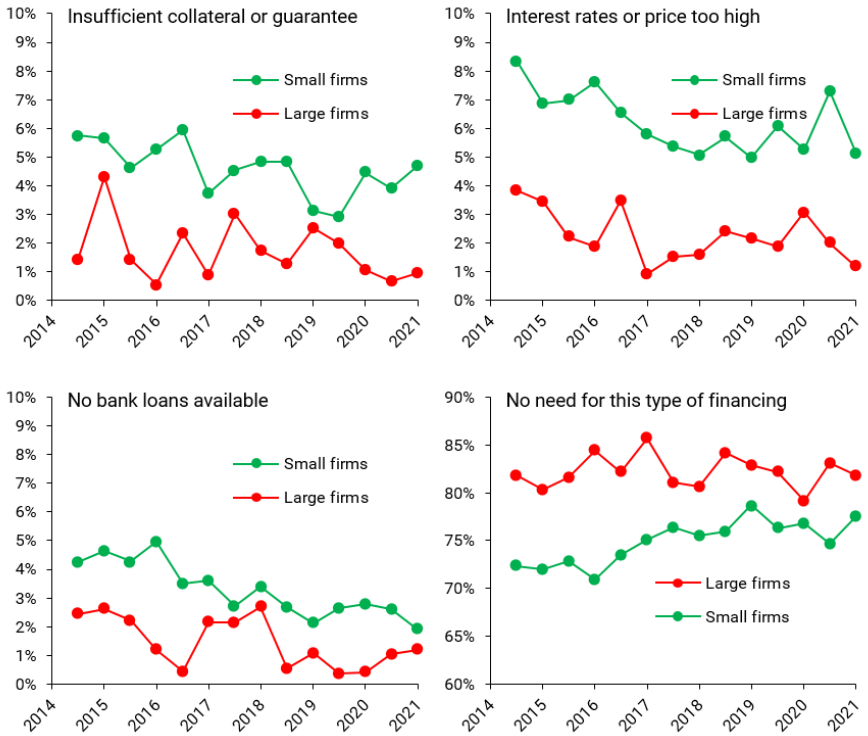
[4] In the OECD countries, in 2008, the median interest rate charged to SMEs was 15.5% higher than the rate charged to large enterprises, whereas in 2016, that percentage had more than doubled, standing at 32.7% (OECD, 2018, p. 8).

[5] In 2009, for instance, only 5.2% of loan applications were rejected among large firms, that share was double for small firms and even three times as large among micro-businesses (European Commission, 2009)



Source: ECB Statistical Data Warehouse, Survey on Access to Finance of Enterprises (SAFE). https://sdw.ecb.europa.eu/browse.do?node=9138776

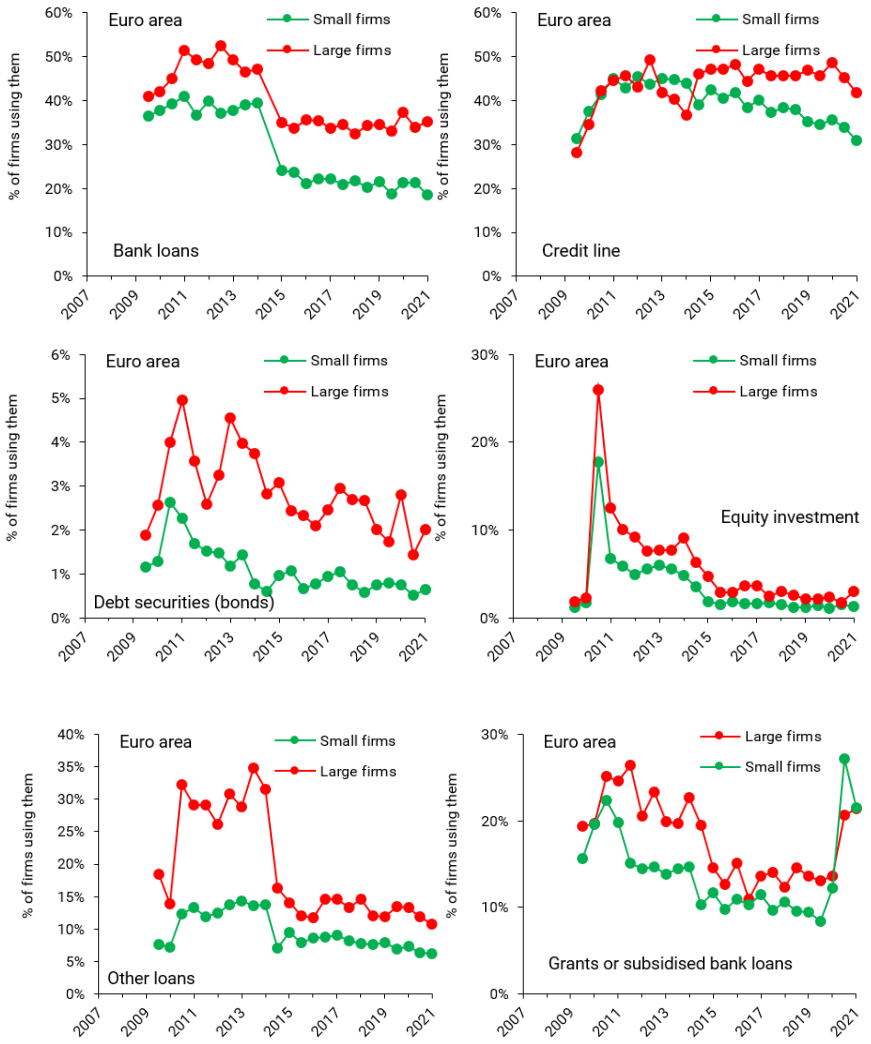
Consistent with the above description, even though SMEs cite insufficient collateral, high interest rates and lack of availability of willing lenders among their reasons for not asking banks for borrowed money relative to larger firms, *fewer* SMEs of those that do not seek bank funding say they do so because they do not need it. This is shown in the next figure.



Most important reason why bank loans are not relevant. Source: ECB Statistical Data Warehouse, Survey on Access to Finance of Enterprises (SAFE). https://sdw.ecb.europa.eu/browse.do?node=9138776

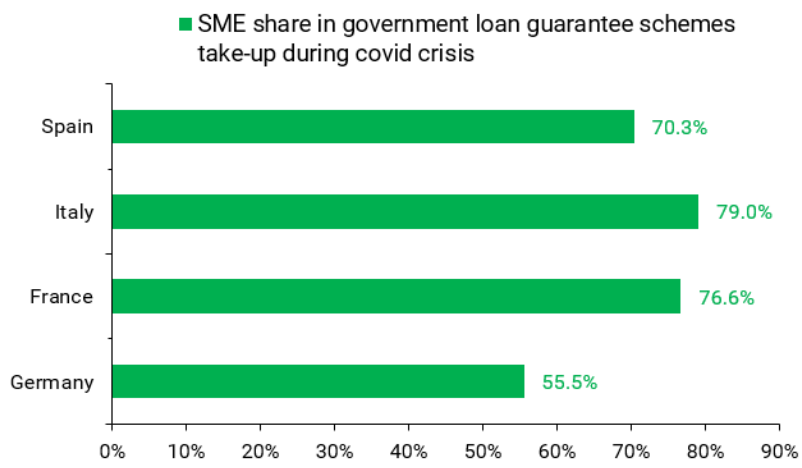
The next figure paints the same picture. Despite the fact that SMEs are reliant on bank loans to a higher extent than larger firms, the unattractive terms at which banks *agree* to lend to them result in SMEs applying less for loans and therefore receiving less loans relative to larger firms. Many SMEs are known to be discouraged, and some of them never attempt to borrow from banks in the first place. Evidence from the US suggests that borrower discouragement is prevalent across SMEs (Levenson and Willard, 2000; Han et al., 2009), and younger and smaller firms are much more likely to be discouraged borrowers (Han et al., 2009).

To compensate for this, SMEs tend to rely more on bank overdrafts, credit card debt and, less commonly, on grants and subsidised loans, as in the recent Covid-19 crisis.



Sources of financing used. Source: ECB Statistical Data Warehouse, Survey on Access to Finance of Enterprises (SAFE). https://sdw.ecb.europa.eu/browse.do?node=9138776

The Covid-19 crisis showed quite presciently the extent to which SMEs are dependent on bank loans. When governments introduced loan guarantees, SMEs were the main beneficiaries and users, as shown below.

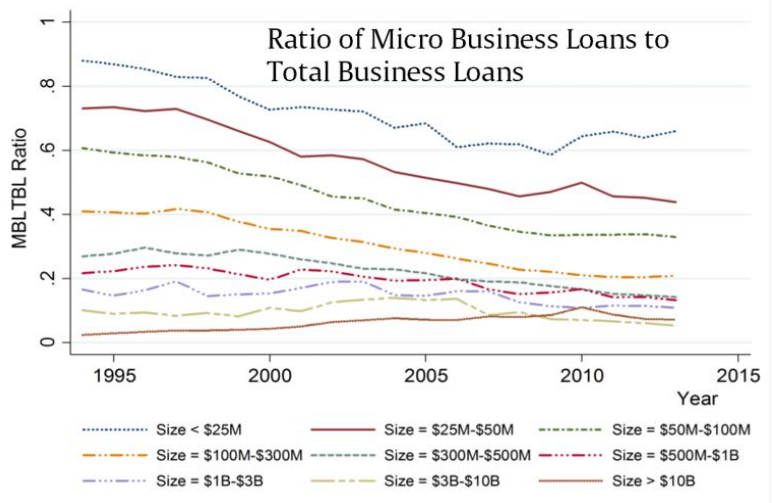


Source: ECB (2021), *Financial Stability Review,* May 2021.

All in all, these data tell us that *SMEs have a hard time accessing external funding*, they are heavily reliant on bank lending, and when their loan applications are accepted, the terms of the loan contract are generally less advantageous compared to larger borrowers.

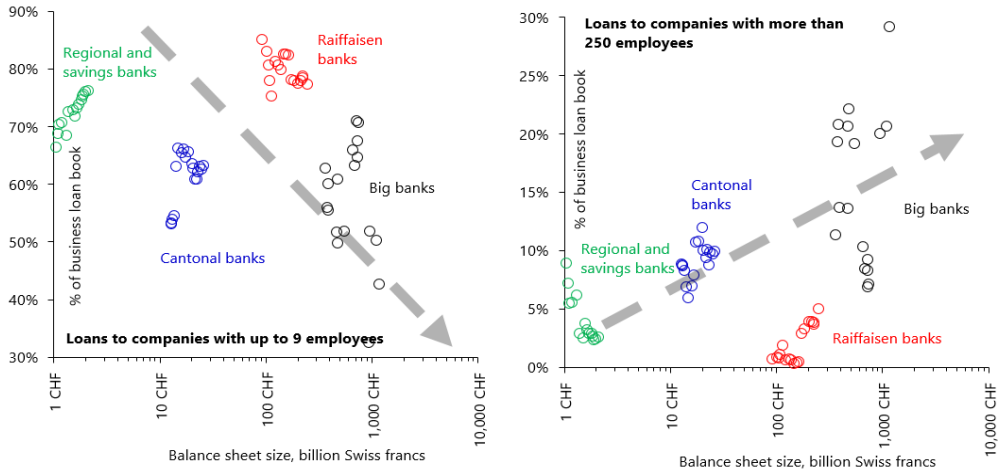
12.3 Large Banks Do Not Serve SMEs

There is a rule in banking: *big banks prefer to do big deals with big customers.* Thus, it is small banks which tend to extend small loans to small businesses, as shown by the work of **Prof. Richard Werner** (see graph below). Consequently, when small banks disappear (due to mergers, closure, etc.), SMEs find it harder to obtain funding from big banks, which prefer to deal with bigger customers.



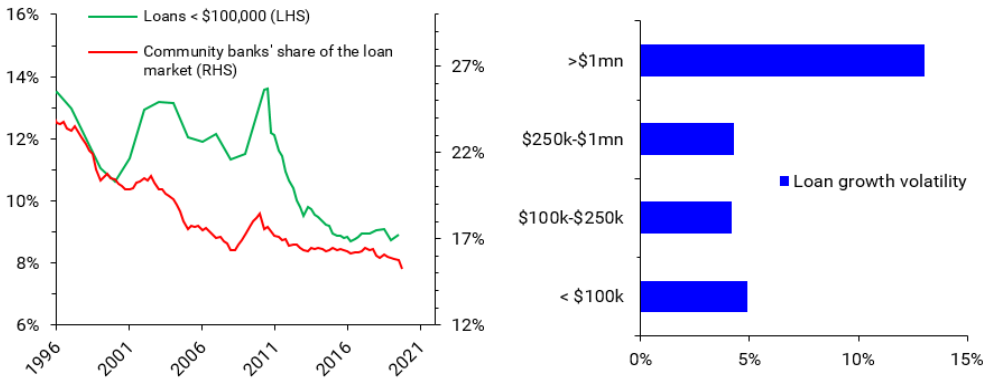
This graph illustrates the actual behaviour of bank lending to micro businesses over time for U.S banks. Each line represents the lending propensity of each of nine bank size groups over the period from 1994 to 2013. Source: Mkhaiber and Werner (2021).

The next figure uses data for Swiss banks to show the same pattern. Loans to companies with less than 10 employees in Switzerland account for a higher share of the balance sheet of smaller banks relative to that of bigger banks. The reverse is true with regards to loans to non-SMEs (i.e., firms with more than 250 employees).



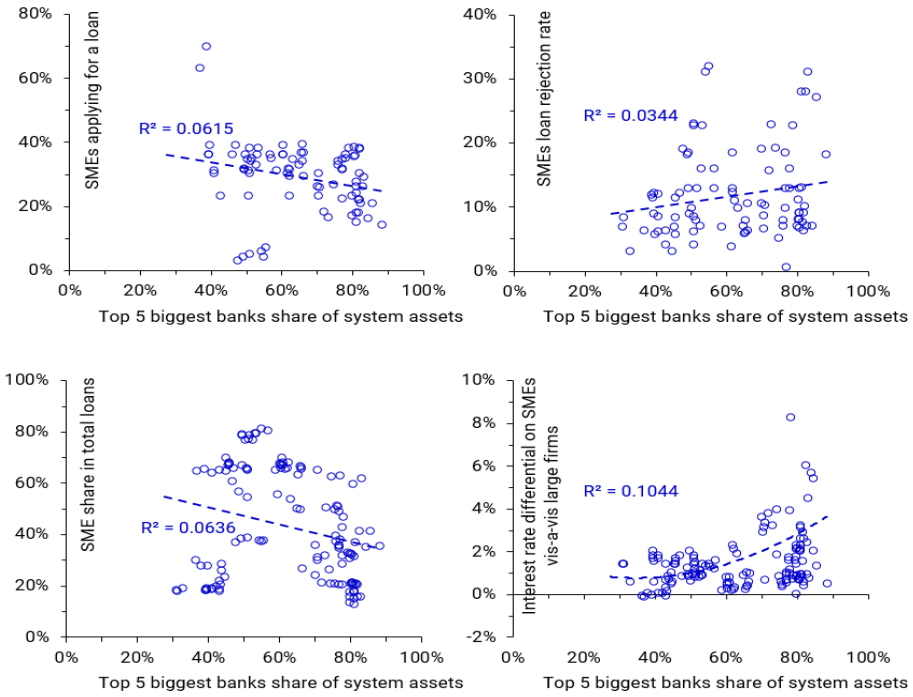
Vertical axis: share of loans to micro-companies (with less than 10 employees) in Switzerland as a percentage of the total balance sheet by type of bank. Data for banks resident in Switzerland. Horizontal axis: balance sheet of the banks. Source: Swiss National Bank. https://data.snb.ch/en/topics

The USA provides an interesting case. Since the mid-1980s, the number of community banks has fallen dramatically, from 15,661 in 1984 to 4,825 in 2019 (a staggering 69% drop in 35 years). As shown below, there is a clear correlation between the share of loans of "small" denomination (loans with principal < $100,000) in total loans and the community banks' share in total commercial and industrial (C&I) loans, suggesting that *community banks are the primary lenders of small-denomination loans,* not surprisingly. Naturally, SMEs are the most likely borrowers of these loans. Incidentally, large-denomination loans (those with principal >$1,000,000) tend to be 3 times more volatile.



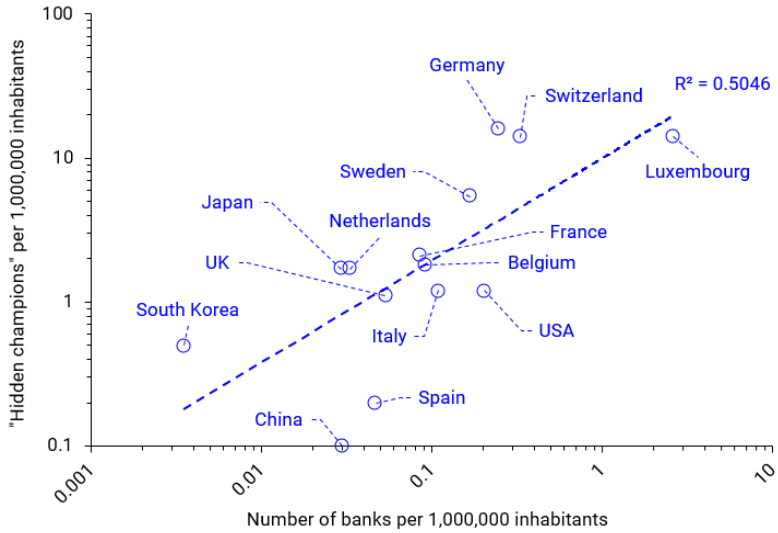
Market share of community banks in total bank lending in the US (green) and the share of commercial and industrial (C&I) loans of denominations below US$1MM in total C&I loans (blue). Source: FDIC

The following figures show some correlations of banking concentration and various variables of relevance related to SME borrowing. As can be seen, in a more concentrated banking system (measured as the share of the biggest banks in total assets), relative to bigger firms, SMEs tend to apply less for bank loans, their loan applications get rejected more often, and they get charged higher interest rates.



Data are for 15 OECD countries, 2007–2016 (source: OECD.Stat, *Financing SMEs and Entrepreneurs: An OECD Scoreboard*), and 45 countries, 2006–2017 (source: World Bank (2019), *Global Financial Development Database*). Complementary sources: BIS, SME Finance Forum.

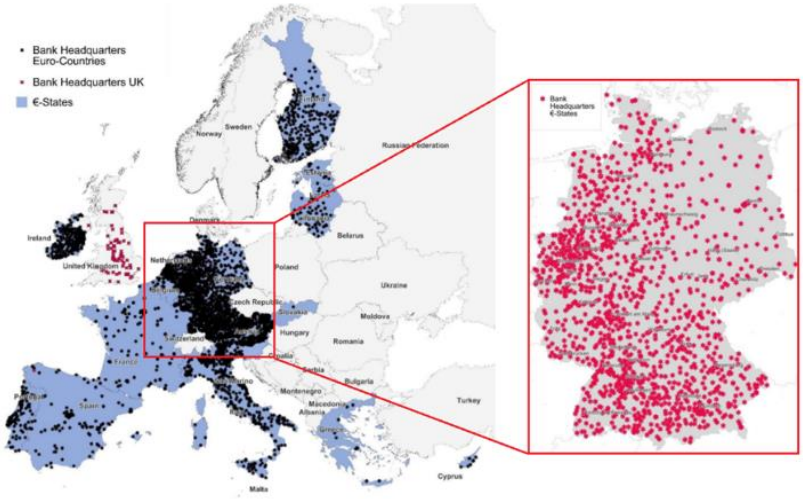
What about that sub-sample of SMEs that is considered the most competitive, the so-called "*hidden champions*", which are those SME firms that rank on the top-3 in terms of global market share in their market niches? The data here also support the view that small banks are critical for their success. The figure below shows that there is a considerable correlation between the number of banks and the number of hidden champions, both measured in per capita terms.



Data are for 2014. Source: Simon, Kucher & Partners; Bank of International Settlements.

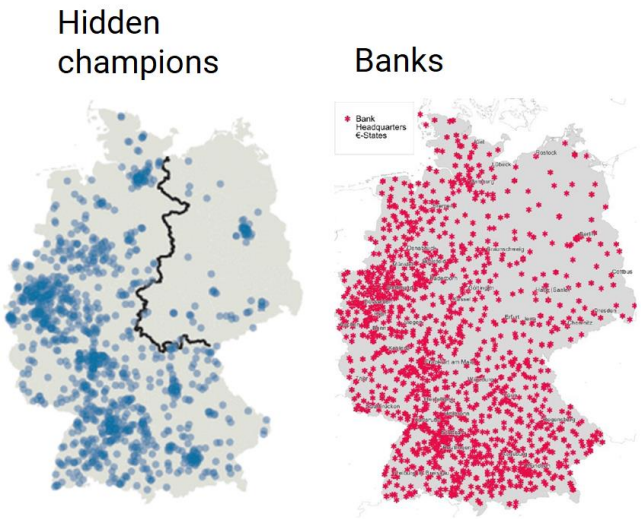
The case of Germany is illuminating. As of 2014, it was the country with the highest number of hidden champions, both in absolute terms (1,300+) and per capita (16 per 1,000,000 residents). German export

competitiveness is widely known. Less known is the fact that Germany is home to some 1,500+ banks (the highest number in Europe). Around 70% of these banks are locally-controlled, small, not-for-profit community banks.[6] These small banks lend to local SMEs, which account for a large bulk of German exports.



Gärtner and Fernandez-Montoto (2018)

The following figure compares the geography of German-based bank headquarters and German hidden champions. The similarities are striking.



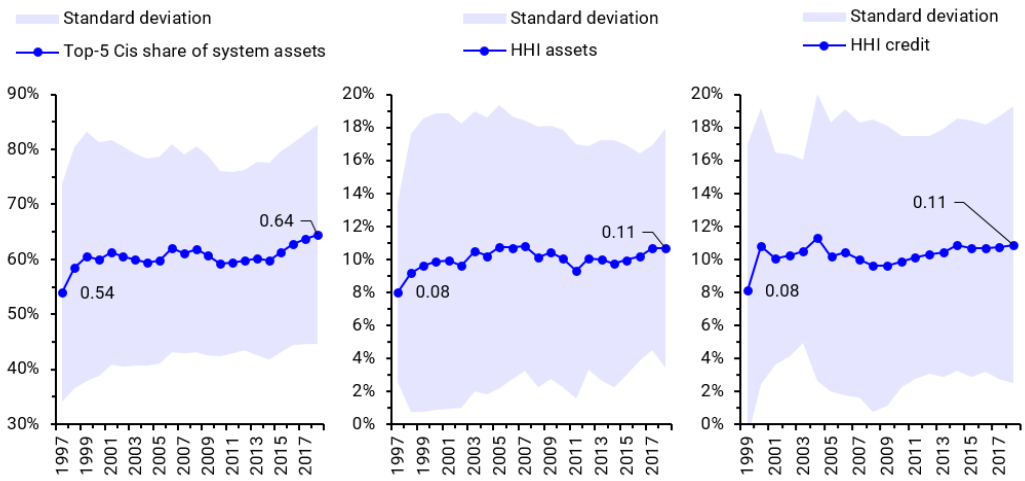
Left: The Economist (2019). Right: Gärtner and Fernandez-Montoto (2018)

… and banking system concentration is increasing in most countries

Sadly, banking systems across the world are only getting *more and more concentrated*. The following figure shows data for 28 EU countries. The various indicators of concentration (the share in total assets of the

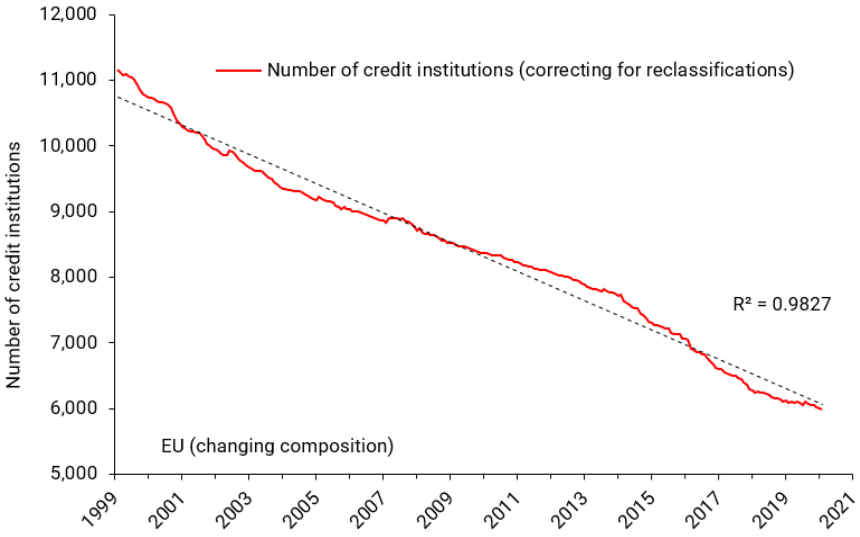
[6] See https://foe.scot/wp-content/uploads/2012/05/Edinburgh-Werner-Case-for-Local-Banks-2012.pdf

biggest 5 banks, the Herfindahl-Hirschman Index (HHI) for assets and credit) have consistently increased in the period of 1997-2017.[7]



Left: Share of biggest 5 credit institutions in system assets. Middle: Herfindahl-Hirschman Index (HHI) for credit institution assets. Right: HHI for credit institutions' credit. Data for 28 EU countries including the UK. Source: ECB Statistical Data Warehouse, Structural financial indicators.

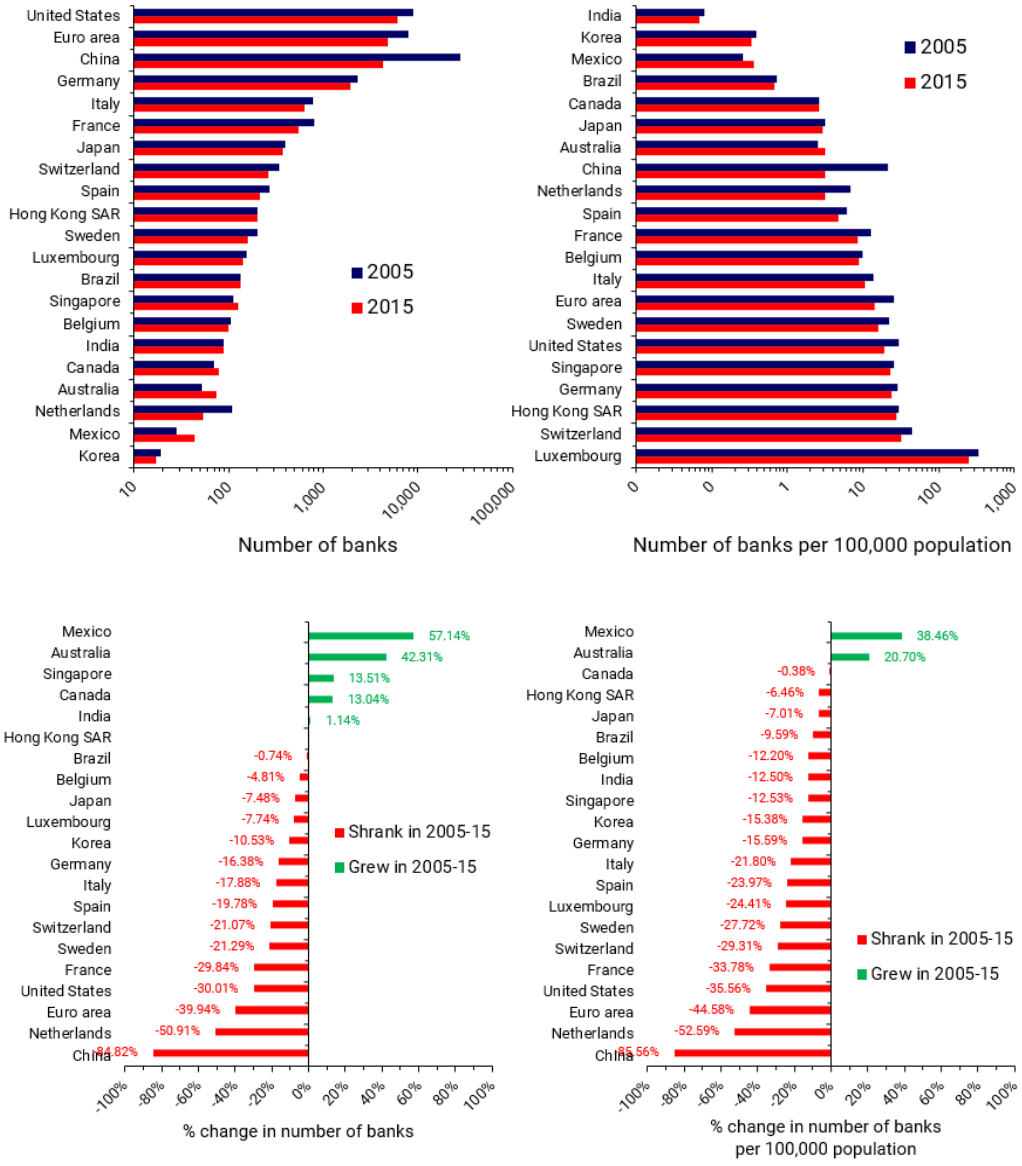
This can be seen also by looking at the number of banks. With the exception of Ireland, the number of banks in European countries has registered a steady decline throughout the last two decades. The following figure shows the total number of credit institutions in the European Union. *If the trend continues, by mid-century there will be less than 100 banks left in the EU.*



[7] The Herfindahl-Hirschman Index (HHI) is a common measure of market concentration and is used to determine market competitiveness. The higher HHI, the higher the concentration.

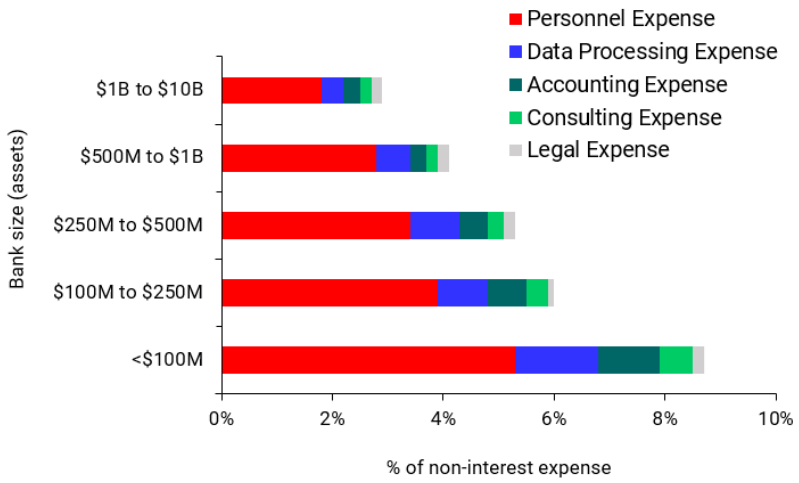
Source: ECB Statistical Data Warehouse, List of financial institutions, https://sdw.ecb.europa.eu/browse.do?node=9691593

The following figure shows data on the number of banks in absolute and per capita terms for a number of advanced countries in a shorter time span, 2005 to 2015. As can be seen, with the exception of Australia, Mexico and a few others, the number of banks has decreased across the board, sometimes dramatically as in the case of China.



Source: ECB Statistical Data Warehouse, List of financial institutions, https://sdw.ecb.europa.eu/browse.do?node=9691593

Although there may be multifarious reasons for the decline, we can point to the relative disadvantage smaller banks have in terms of *compliance costs*. As shown below, smaller banks tend to lack the economies of scale of bigger banks, and compliance costs represent a higher percentage of their non-interest expenses (up to 4 times).



Sample consists of 469 U.S. banks. Source: Dahl and Meyer (2016)

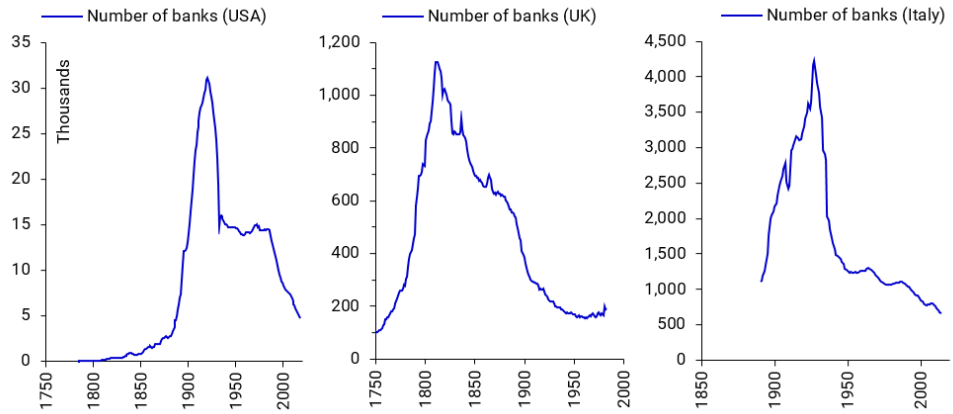
Note that the data of the previous figure are for the USA, where there are a different set of regulations for small and big banks. In the EU, authorities mandate that *all* banks adhere to the same regulations (i.e., Basel III/IV, etc.), regardless of their size.

The following table shows the cost of compliance as a percentage of assets for a sample of 251 EU banks. An even more dramatic result emerges: *for smaller banks, compliance costs are on average 25 times that of large banks* (1.03% might not seem like a lot, but remember that banks have return-on-assets in the range of 0.1-0.4%).

	Number of banks	Average
SNCI	163	1.03%
Medium	49	0.56%
Large	39	0.04%
All institutions	251	0.79%

Compliance costs in percent of total assets (average across 2018-2020). SNCI stands for Small and Non-Complex Institutions. Source: EBA (2021, p. 72)

Sometimes in economic policy circles, this reduction in the number of banks is considered a positive development, and the argument that “there are too many banks” can sometimes be heard. This cannot possibly be true if we take a historical perspective. If we go back to the 1700s, we see that the number of banks today is *already* close to historical minima (more so in per capita terms), and one would have to go to the late-19th century in the case of the USA and Italy, and to the mid-18th century in the case of the UK, to find a comparable figure.



The number of banks in the USA, UK and Italy. Sources: Mitchie, Bank of England, British Bankers Association, Weber (2006), Fohlin and Jaremski (2019), FDIC.

12.4 Large Banks Lend for the Wrong Reasons

Bank lending for speculative purposes creates banking crises and recessions, bank lending for consumption creates consumer price inflation, and bank lending for capital formation creates economic growth

For centuries, it was thought that for an economy to grow, the amount of money in circulation ought to increase proportionally. This was the famous "quantity theory of money", also called the "equation of exchange". This equation, linked together with the "real economy" (*Y*) (what we today call real Gross Domestic Product or GDP), the price level (*P),* with the amount of money (*M*), which circulated with certain velocity (*V*).

For a while, this relationship worked well empirically, and the data seemed to suggest the equation was valid, which meant that velocity *V* was relatively constant, and the link between money *M* and the real economy *Y* was understood: more money, more economic activity.

In the 1970s, however, the equation began to break down, and velocity *V* no longer seemed stable; it actually fell substantially during the 1970s through the 1980s across industrialised countries. As Charles Goodhart, a prominent UK monetary economist put it:

"The equation came apart at the seams during the course of the 1980s" (Goodhart, 1989).

In other words, the link between money and the economy was no longer a reliable one. The economics profession reacted by capitulation and dropped money altogether from virtually all economic models (the infamous DSGE models that failed to forecast the 2008 crisis) (Wieland V & Wolters M, 2012).

During the 1990s, a series of papers by Werner (1992, 1997) appeared that showed that the equation was still valid, it only had to be adapted to our modern banking system.

Werner performed two operations to the quantity equation:

- Replace money (*M)* with bank credit (C^b)
- Divide the money stream into two: money that goes into the real economy ($C_R{}^b$), like loans for SMEs, and money that goes into speculation and unproductive uses ($C_F{}^b$), like real estate and investment funds.

The replacement of money (*M)* by bank credit (C^b) can be done because, as several central banks and dozens of economists now recognise, *banks create money when they grant loans*. The Bank of England, for example, explains in a 2014 paper that:

"When banks make loans, they create additional deposits for those that have borrowed … Banks making loans and consumers repaying them are the most significant ways in which bank deposits are created and destroyed in the modern economy" (Bank of England, 2014)

More recently, the Bundesbank stated that:

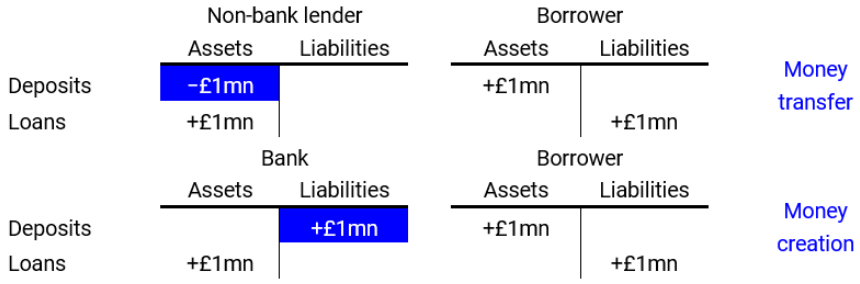
"In fact, book money is created as a result of an accounting entry: when a bank grants a loan, it posts the associated credit entry for the customer as a sight deposit by the latter and therefore as a liability on the liability side of its own balance sheet. This refutes a popular misconception that banks act simply as intermediaries" (Bundesbank, 2017)

According to the UK's most prominent monetary economist, Charles Goodhart, this new view "is now taking over as the consensus approach" (Goodhart, 2017).

In a landmark experiment, Richard Werner (2014a) performed an empirical test on a small German bank in lower Bavaria, the *Raiffeisenbank Wildenberg e.G*. The test consisted in borrowing €200,000 from the bank and recording all the internal transactions that the bank registered in its IT accounting system. The test showed without a doubt that the bank created the money when it extended the loan. No money was transferred from other accounts inside or outside the bank. The money was created "out of nothing".

In other words, unlike non-bank firms, banks *create money when they lend to households, firms and governments.* They do so by crediting the borrower's account, as a simple double-entry book-keeping exercise.

The next figure shows the structural difference between the mechanics of bank lending and non-bank lending.



Mechanics of lending by non-banks (top) and banks (bottom).

Thus, the quantity theory of money can be turned into two separate equations:

$C^bV = C_R{}^bV_R + C_F{}^bV_F$

$PQ = P_RQ_R + P_FQ_F$

The next step in Werner's logic was to equate the first pair of variables and the second pair of variables, so that:

$C_R{}^bV_R = P_RQ_R = P_RY$

With $V_R = P_R Y / C_R{}^b$ constant

And:

$C_F{}^b V_F = P_F Q_F = P_F A$

With $V_F = P_F A / C_F{}^b$ constant

Applying the chain rule for differences (that is, $\Delta(ab) = a\Delta b + b\Delta a$. With a constant, $\Delta(ab) = a\Delta b$) which, when applied to stocks, represent flows:

$\Delta P_R Y = \Delta nGDP = \Delta C_R{}^b V_R$

$\Delta P_F A = \Delta C_F{}^b V_F$

Finally, using year-over-year relative growth rates:

$\Delta nGDP / nGDP = \Delta C_R{}^b / C_R{}^b$ (1)

$\Delta P_F A / P_F A = \Delta C_F{}^b / C_F{}^b$ (2)

The quantity theory of money turned into a new theory: *the quantity theory of disaggregated credit (QTDC).* It has two predictions:

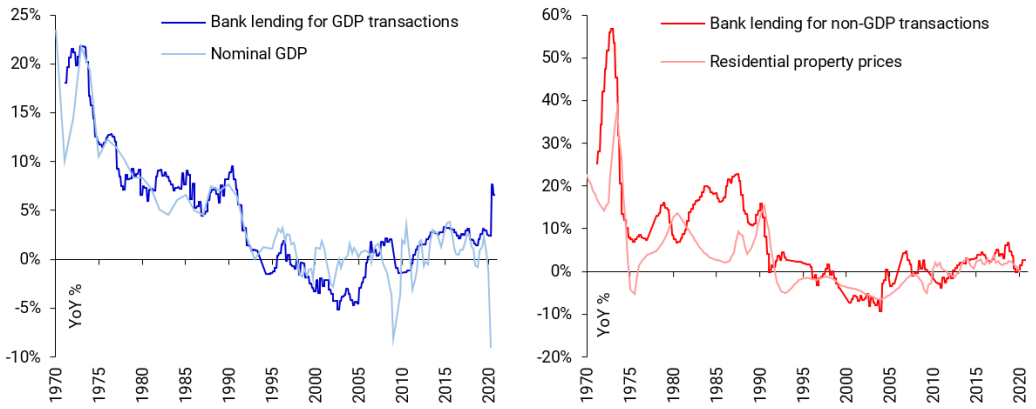
- Equation (1): the economy grows if bank lending for the real economy grows
- Equation (2): asset bubbles are caused by non-productive bank lending

Since it was formulated in the 1990s by Werner, other scholars have put the theory to test with successful results.[8] Virtually all of the papers found that bank lending to the real economy, measured in various ways, was the only statistically significant variable explaining nominal GDP growth.

The next figure shows estimates by Werner (1997) for the Japanese economy during the 1980s and 1990s. The left panel shows the first prediction of the theory, namely, that nominal GDP growth ought to be caused by bank credit for GDP transactions. The right panel shows the second prediction: asset bubbles (in this case land prices) are caused by bank credit to real estate.

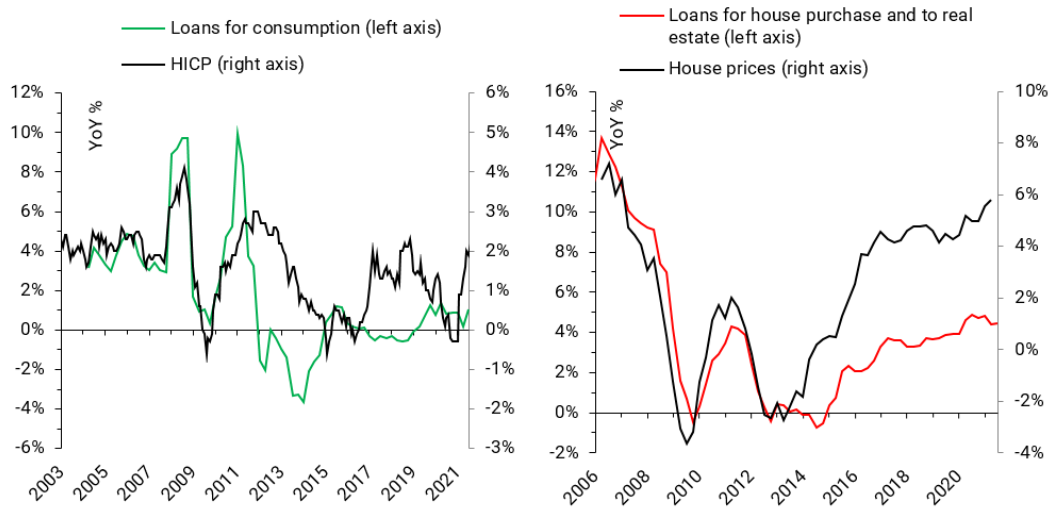
The econometric tests performed by Werner confirmed the predictions, but we can see by visual inspection that the theory is very plausible.

[8] The QTDC was tested in Japan by Werner (1992, 1993, 1994, 1997), it was later applied to the Czech Republic (Bezemer and Werner, 2009), the UK (Lyonnet and Werner, 2012; Ryan-Collins, Werner and Castle, 2016), Spain (Werner, 2014c; Bermejo-Carbonell and Werner, 2018), Germany (Kusin and Schobert, 2014), and Japan later again (Werner, 2005, 2012; Voutsinas and Werner, 2011b).



Source: Werner (1997), Bank of Japan.

The next two panels use data for the euro area.



Left panel: bank loans for consumption and consumer price inflation, measured as the annual change in the Harmonised Index of Consumer Prices (HICP). Right panel: bank loans for house purchase and to real estate-related businesses, and house prices. Source: ECB Statistical Data Warehouse; author's calculations. https://sdw.ecb.europa.eu/

In the area of banking and macroeconomics, Richard Werner's quantity theory of credit stands as the empirically most successful theory. The theory has far-reaching implications:

1) The economy can only grow if banks lend for activities that contribute to GDP

This includes lending to firms that will invest (I) in machinery, R&D, staff training, acquisition of fixed assets, etc.; lending to governments (G) who will spend in paying civil servants and infrastructure projects, and lending to households for consumption (C).

GDP = C + I + G + NX

2) Asset bubbles can be prevented

This can be done by redirecting bank lending away from mortgages and lending to other financial institutions, to lending to non-financial firms.

3) Only lending to the real economy is sustainable

For every pound in new debt created by bank loans to the real economy, there is a one-pound increase in national income (GDP). Therefore, the debt is sustainable and can be serviced and repaid. GDP grows in tandem with debt, and debt-to-GDP levels stay constant.

Bank lending to non-GDP activities, on the other hand, increases debt but does not increase GDP. It leads to ever-higher debt-to-GDP ratios which create crises, recessions and debt overhangs that stifle growth. They also decrease house affordability and increase inequality through capital gains.[9]

4) Lending for consumption can create inflation. Lending for investment in machinery, equipment, R&D, etc., is less inflationary

If more money chases a fixed amount of goods and services, it is more likely that this will result in inflation than if lending is directed at investment, which will expand the productive capacity of the economy and thus increase demand as well as supply of goods and services.

5) Small banks can have big effects

Unlike non-bank financial intermediaries like investment funds, bank lending creates money, and if fed adequately to the economy (through GDP expenditures), it can make whole communities and regions grow in a sustainable way.

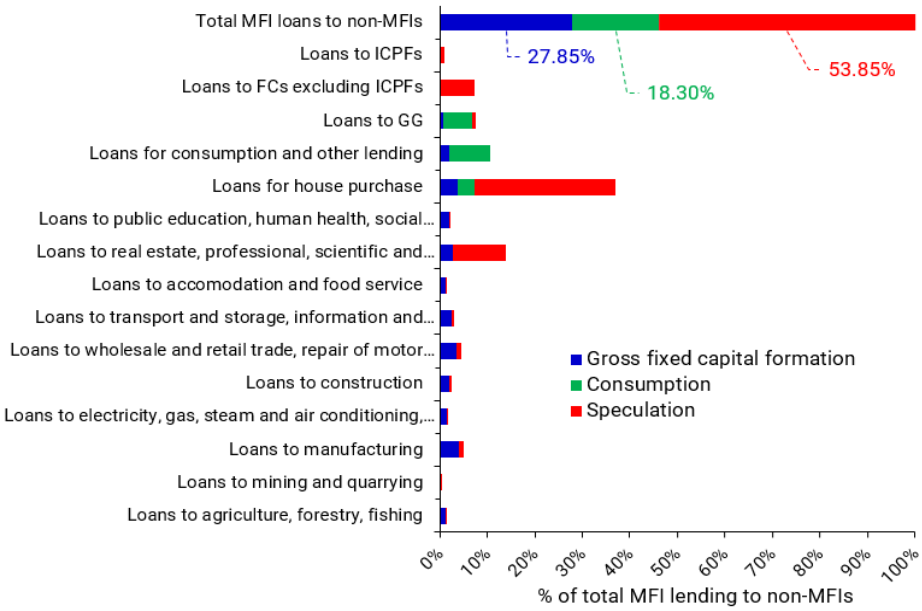
Furthermore, SMEs are the biggest employer in most countries, and they are the backbone of any economy. As mentioned, a dramatic case in point is provided by German SMEs: well-served by the thousands of small, not-for-profit community banks, these SMEs can access funding to grow. In fact, during the 2008-09 recession, unlike the big German banks, the small banks increased lending to their SME customers when they most needed it. Germany has the highest number of "hidden champions", more than any other country in the world. These firms are world leaders in their niche markets in terms of market share, and they contribute substantially to Germany's 8%-odd trade surplus.

From the perspective of the quantity theory of disaggregated credit, the composition of the loan book of European banks looks far from desirable. The next figure breaks down euro area bank lending into different sectors and according to whether the funds are used by borrowers for capital formation (e.g., machinery, R&D), consumption, or speculation (all non-GDP transactions, e.g., acquisition of financial assets, of existing real estate assets) (in the previous equations, capital formation and consumption are part of $C_R{}^b$, and speculation is part of $C_F{}^b$).

As can be seen, as of Q2 2021, only 27.85% of bank lending is directed at capital formation, 18.3% is directed at consumption, both of which contribute to economic growth, although only the former creates *real* (inflation-adjusted) GDP growth. Stunningly, 53.85% of bank loans are for speculative purposes, mainly the

[9] It is quite well-established that house prices can be explained by: (i) on the demand side, the amount of real estate loans and household mortgages (Anundsen and Jansen, 2013, p. 6, Tables 1 and 2; Werner, 1997), and (ii) on the supply side, the elasticity of supply of housing by the construction sector (ESRB, 2015, pp. 31–32; Gao, Sockin and Xiong, 2015, p. 1; Gyourko, 2009, p. 11), which in turn is influenced, among other things, by regulatory supply constraints, city-level population, population density, and geographic constraints like steep topography (Glaeser, Gyourko and Saiz, 2008, pp. 36–37; Oikarinen and Valtonen, 2014).

acquisition of existing houses which, as mentioned, translates into higher house prices but does not contribute to GDP growth.

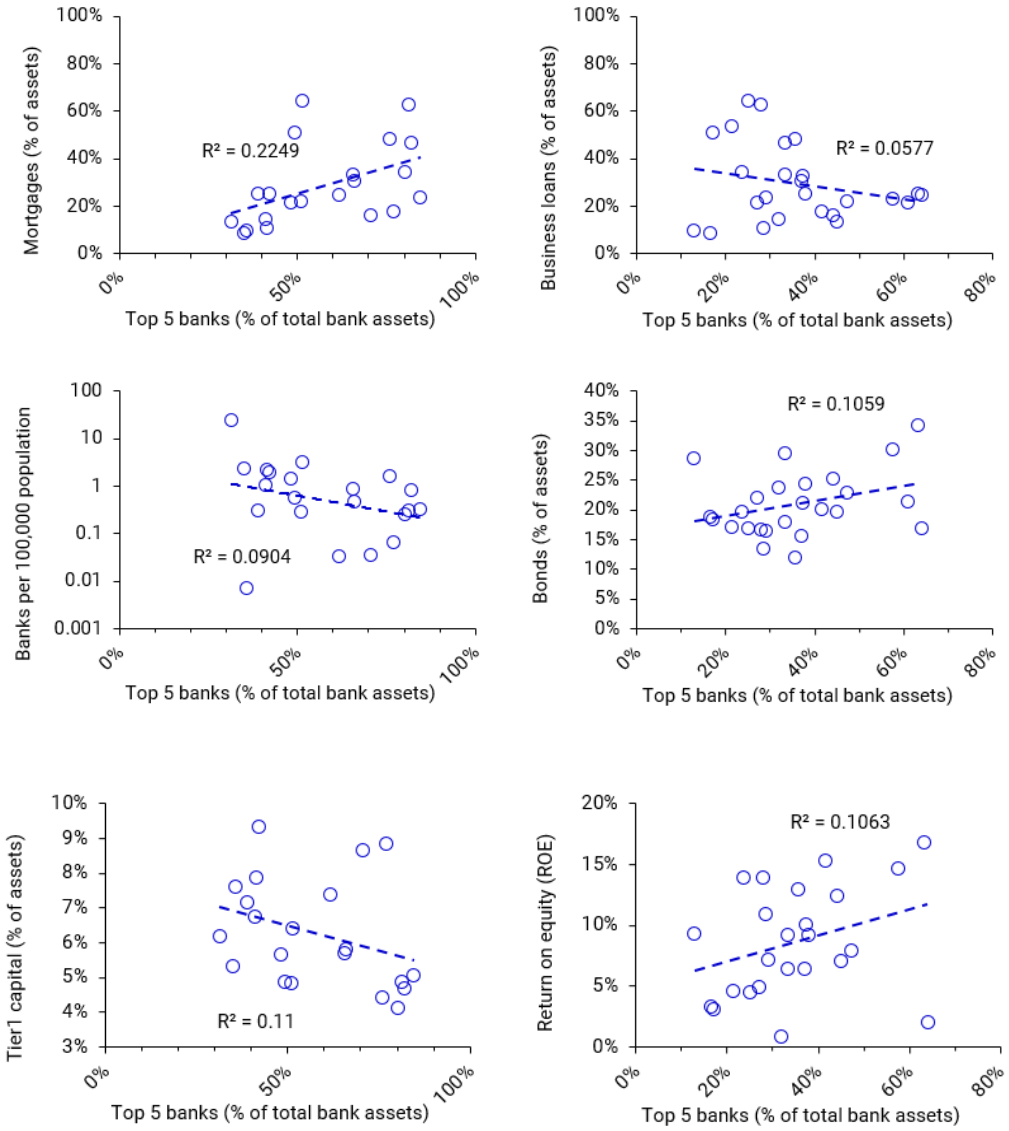


Source: ECB Statistical Data Warehouse.

Worse still, the share of speculative loans in total loans has only increased in the last 17 years.

12.5 Concentrated Banking Speculates and Holds Less Capital

Finally, as shown in the figure below, there is some evidence that more concentrated banking systems go hand-in-hand with a higher share of mortgages in total bank loans, and a lower share of business loans. They also tend to hold more bonds (typically government bonds, which fund mostly consumption and to a lesser extent capital formation), have less capital, and are more profitable.



Data are for 2015. Source: BIS banking structure data.

12.6 Summary of the Financial System

In particular for net job creation, it is evident that SMEs are crucial for any economy. Despite their heavy dependence on banks for their main source of external funding, SMEs are usually charged higher interest rates and struggle to access necessary finance from their banking provider.

Small businesses are subject to ever increasing stress as banking systems are universally becoming more concentrated with fewer banks operating. Empirical data shows that the remaining banks are becoming more speculative and increasing the share of mortgages on their balance sheets; this behaviour contributes little to economic prosperity and, in fact, engulfs economies in banking crises and deep recessions.

Community banks create a more robust and resilient economy, and enable SMEs to thrive. Evidence shows that as the number of banks per capita increases, the number of successful SMEs or “hidden champions” per capita increases with them. Valhalla Network will democratise finance and create these sturdy economies.

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