



VIETNAM

SELECTED ISSUES

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Approved By
**Asia and Pacific
Department**

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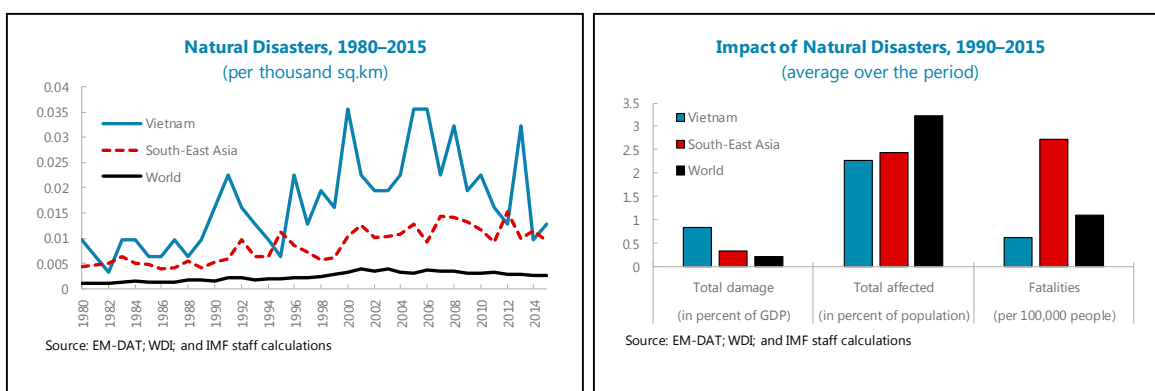
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ENVIRONMENT AND CLIMATE CHANGE¹

Vietnam's economy and population are expected to be increasingly affected by climate change. In addition, the country's growth model—which permitted quick reduction of poverty—has been unsustainably relying on mining and natural resources and air, land and water pollution increased. Well aware of the critical challenges faced by the country, the government has undertaken numerous initiatives and programs to adapt the economy to climate change risks and transform the growth model to support an environmental-friendly economy, but significant challenges remain.

A. Climate Change Risks

1. Vietnam is highly affected by climate change. Its long coastline, geographic location, and diverse topography and climates contribute to Vietnam being one of the most hazard-prone countries in the Asia-Pacific region. Given the high concentration of the population and economic assets in coastal lowlands and the significant role played by agriculture and fisheries in the economy, Vietnam is ranked among the five countries likely to be most affected by climate change.² Over the last 50 years, temperatures have increased twice as fast as the global average, the sea level has risen by 20 centimeters and the frequency and intensity of extreme weather events (drought, flood, salinization) have risen sharply.³ Natural disasters result in 470 fatalities and cost 0.8 percent of GDP (annual average between 1990 and 2016).⁴



2. Climate risks pose immense challenges. Based on the authorities' climate change scenarios, by the end of the century, sea levels are expected to rise by up to a meter. Sea waters would then cover 40 percent of the Mekong Delta area (where half of the country's rice is produced), 3 percent of coastal provinces and 20 percent of Ho Chi Minh City, impacting directly

¹ Prepared by David Corvino (APD).

² GFDRR Country Profile for Vietnam.

³ Vietnam National strategy on climate change.

⁴ Cred EM-DAT database. Includes climatological, hydrological and biological disasters.

10–12 percent of the population and reducing GDP by 10 percent. The sectors most affected will be agriculture, aquaculture, energy transportation and tourism.

3. Climate change could threaten agricultural development and food security. Overall, the contribution of the primary sector was 15 percent of GDP in 2016—in decline from 18 percent in 2010—and employed about 45 percent of the labor force. Agricultural commodity exports accounted for 13 percent of total exports in 2016 (US\$22 billion). Rising sea levels already cause agricultural lands to narrow and increase the frequency of sea water intrusion episodes, particularly in deltaic regions. Climate change is also likely to increase the frequency, severity and intensity of hydro-meteorological events, lengthen droughts during dry seasons and strengthen floods in rainy seasons. Absent adaptation measures, key crop yields (rice, coffee, maize, cassava) and their production would be strongly affected, impacting rural income, food security, and commodity exports. In 2016, rice production fell by 1.1 million tons due to salinization in the Mekong Delta. Rice, which is grown by nearly 80 percent of Vietnamese farmers on 45 percent of the agricultural land, could see its production decrease by 9 million tons (13 percent) by 2050. Climate change is also likely to affect fisheries, aquacultures, and forestry.

4. Other sectors, such as energy and transportation, are vulnerable to climate change. Changing temperature trends will affect the demand for a variety of energy-related services, such as air-conditioning, industrial cooling and agriculture drainage pumps. A 1 degree Celsius rise in summer temperatures is expected to raise energy demand by 1 percent. This change will occur in conjunction with the increased energy demand from population growth and improvement of living standards in Vietnam. Like most infrastructure-intensive industries, energy and transportation are vulnerable to the impacts of extreme climatic events. Studies indicate that a rise of 1 meter in sea level would submerge 10,000 kilometers of roads. Increased rainfall variability and intensity will affect hydropower generation and cause landslides in the uplands, which would damage road and railway networks.

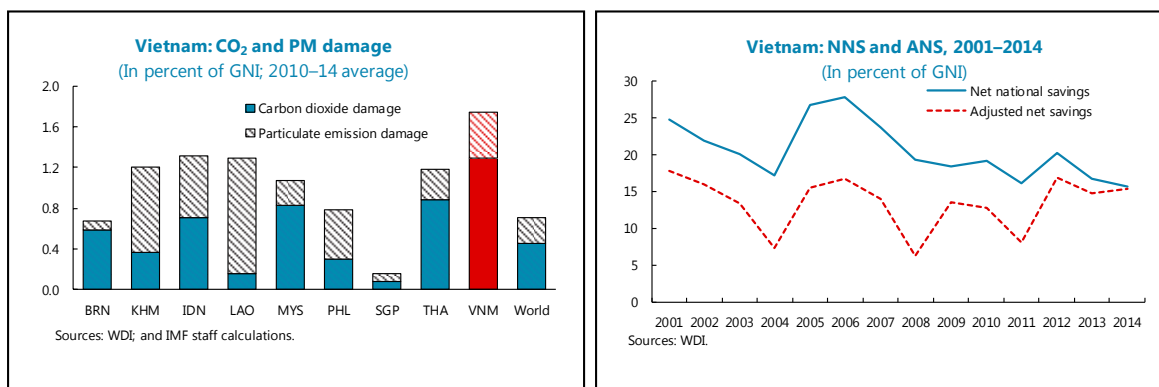
5. Climate change risks will weigh on the Vietnamese population. Lower agricultural incomes, the erosion of coastal land and the deterioration of some arable land will have adverse effects on poverty reduction and could accelerate rural to urban migration. A significant portion of Vietnam's urban population lives in informal settlements, making them vulnerable to excessive heat, floods and violent storms. Coastal cities are particularly exposed to many risks, including sea-level rise, increased tropical storm intensity and sudden river flooding, exacerbated by the lack of suitable drainage facilities. Ho Chi Minh City, whose population approaches close to 10 million, is projected to be among the cities in the region most affected by sea-level rise and increased storm surges.

B. Environmental and Resource Sustainability

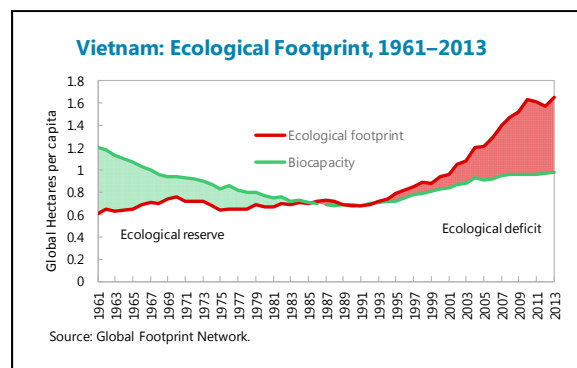
6. Rapid resource-intensive development and war have resulted in environmental degradation and destruction of natural capital, despite rapid economic development. Rapid industrialization since the 1990s has led to impressive growth and poverty reduction. But growth has relied on intensive, unsustainable exploitation of mining and other natural resources. Vietnam's stock of natural capital has declined as mineral and non-mineral resources were depleted and air,

land and water pollution increased. Legacy issues related to war add to the urgency of environmental upgrade in Vietnam, especially the need to complete cleanup of dioxin hotspots and more effective social policies to deal with longer term health effects (hereditary diseases and birth defects in the affected areas).

7. Vietnam's Adjusted Net Saving (ANS), a comprehensive indicator of changes in the country's wealth, is significantly less than national saving as conventionally measured. ANS was developed at the World Bank. It corrects national saving as conventionally measured for changes in natural capital (N) and human capital (H). N consists of reproducible and non-reproducible mineral and non-mineral resources, including environmental resources such as clean air, water and soil. Changes in H are proxies by education spending. ANS is defined as Net National Savings (NNS) corrected for resource depletion, environmental degradation, and education spending. Despite strong education spending, Vietnam's intensive oil production and CO₂ and particulate emissions have caused ANS to be strongly lower than the NNS. In recent years, lower oil production has reversed that trend, and in 2014, the gap was close to zero.



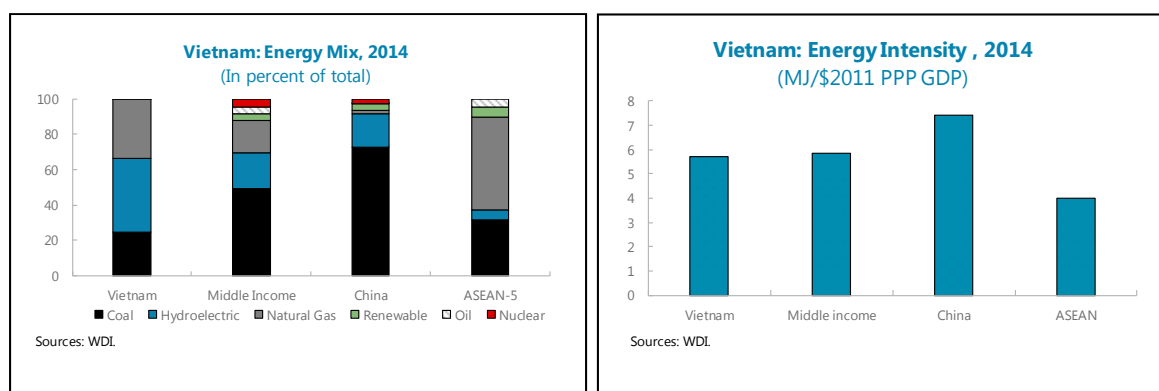
8. Agriculture and industry have contributed significantly to degradation of natural capital. Vietnam is one of the largest users of fertilizer in the world which, together with intensified livestock production, contributes largely to polluting land and water. Deforestation and erosion problems are an issue in certain regions where arable land is needed for agriculture. Shrimp aquaculture and fisheries have been the cause for large-scale destruction of mangroves and are a major source of water pollution, due to the use of chemicals and antibiotics. Overfishing in the near shore areas and use of destructive methods are causing depletion of fisheries, a primary source of livelihood for coastal communities. The industrial boom has been accompanied by increased land and water pollution, partly due to the absence of waste management and control. In 2016, a steel plant released large amounts of toxic chemical waste, killing fish along a



long stretch of coast, causing long term disruption in the livelihoods of fishermen and reducing tourism in affected provinces by about 30 percent.

9. Air pollution is a severe problem. Vietnam is among the top ten countries affected by air pollution: in large cities and industrial zones, levels of fine particulate matter are comparable to China's. Studies in Ho Chi Minh City revealed association between air pollution concentration and hospital admissions for lung and respiratory problems, pointing out the already problematic impact of air pollution on health. The major sources include fuel combustion by industry and the power sector, transport domestic and commercial emissions from using coal and biomass. Greenhouse gas (GHG) emissions are expected to double between 2010 and 2020 and triple by 2030, and the entire population is exposed to levels exceeding WHO guidelines.

10. The energy sector is a major contributor to air pollution. Vietnam is the 20th largest user of coal fired plants in the world. It produces a quarter of its electricity from coal, with the remaining coming from hydroelectric power and natural gas. To meet rising energy demand, Vietnam's current Power Development Plan (PDP VII) emphasizes coal fired power and projects 55GW of power to be fueled by coal in 2030, up from 14GW today. If implemented, coal would then amount for 53 percent of the country's energy mix, which would make Vietnam the eighth largest user of coal for energy production, with levels similar to Russia or Indonesia, despite a smaller population. In addition to the risks and costs from relying highly on imported coal, a Harvard report estimates that fatalities from air pollution due to coal-fired plants would rise from 4,300 to 25,000 per year.⁵ In addition, Vietnam is the most energy intensive economy in the Southeast Asia and in line with its peer. Large reduction of GHG emissions could be made from a more energy-efficient economy.



C. Vietnam's Initiatives and Commitments

11. Vietnam is placing climate change and the environment at the core of the country's development agenda. National strategies and related action plans were developed to address the key policy issues. The National Climate Change Strategy (NCCS), issued in 2011, sets a list of objectives and targets for the government up to 2050, with a view to: (a) improve climate change resilience through mitigation and monitoring; (b) strengthen the country's adaptability by lowering

⁵ Burden of disease from rising coal emissions in Asia, Kopplitz and all, 2015

the risks posed by climate change; and (c) adopt a more sustainable, low-carbon growth model. The National Green Growth Strategy (NGGS) approved in 2012, tackles environmental issues and aims at achieving a low carbon economy and protecting natural capital. To achieve these ambitious objectives, the strategy defines underlying targets such as the improvement of energy efficiency, the gradual limitation of sectors generating pollution and natural resource degradation, the development of key sustainable infrastructure (transportation, energy, irrigation and urban works) and the reduction of GHG emissions.

12. Steps have been taken to develop cleaner and more sustainable energy sources. The Renewable Energy Development Project, in partnership with the World Bank, plans to increase the share of renewable energy to 30 percent in 2030 by providing credit support for renewable energy investments and facilitating private sector participation. Progress has been made with the operational start of several wind power plants and General Electric is investing in a US\$1.5 billion project to produce up to 1,000 megawatts of wind generated electricity by 2018. Many other projects are in early stages, but electricity pricing remains an issue for private sector profitability. Other notable adaptive initiatives have aimed at increasing forest plantation, improving energy efficiency with new regulations for newly constructed office and commercial buildings and develop public transportation networks in urban areas.

13. By ratifying the Paris Agreement on Climate in 2016, the authorities have committed to reduce GHG emissions by 2030. Vietnam's Nationally Determined Contributions (NDC) comprises two main components, the mitigation of GHG emission and the adaptation to climate change. The authorities have made the commitment to reduce GHG emissions by 8 percent compared to business as usual, financed by domestic resources. With international support, the reduction could attain 25 percent. In addition, Vietnam is dedicated to achieve the Sustainable Development Goals by 2030, many of which contain targets to tackle environmental and climate change issues.

14. To deliver climate change policies, the government as created an inter-ministerial committee and initiated four key national programs. The National Committee on Climate Change (NCCC), chaired by the Prime Minister and including key ministers, was established in 2012 to lead, coordinate, harmonize and monitor climate change and green growth program implementation, including international cooperation. The NCCC defines implementation action plans and objectives for ministries, provinces and implementing bodies. The authorities have also introduced four policy implementation programs: (i) the National Target Program to Respond to Climate Change (NTP-RCC); (ii) the Support Program to Respond to Climate Change (SP-RCC); (iii) the National Scientific and Technological Program on Climate Change aiming to support the NTP-RCC; and (iv) the National Target Program on Energy Efficiency and Conservation (NTP-EE).

D. Policy Considerations

15. Despite the initiatives discussed above, significant policy challenges remain. Climate change financing represents a critical challenge for public financial management. Comprehensive costing as well as identification of financing of adaptation and mitigation projects remains difficult.

The numerous national strategies—sometimes with conflicting objectives—must be harmonized, in order to align climate change and environmental objectives at the national, provincial and sectoral level.

16. Environmentally friendly tax and subsidy reforms and independent environmental regulation are an important part of the policy toolkit. Pigouvian taxes and subsidies can play a determining role in addressing environmental issues by reflecting social costs and benefits of production and consumption activities. They induce firms and households to adopt environmentally-friendly behavior and incentivize green investments. It is also important to create fiscal space to ensure that adaptation action plans be financed and that emergency funds and safety nets are sufficient to mitigate climate change, which impacts primarily low-income households. Arms length regulation is likewise essential.

17. Low energy prices have negative ecological impacts. Research from IMF's Fiscal Affairs Department estimates that to fully price negative externalities associated with fuel consumption, tax on gasoline in Vietnam should be increased by 0.46 US dollar per liter (0.43 US dollar for diesel).⁶ The government's proposal to double the environmental protection tax on petroleum consumption—from an average of 0.11 to 0.24 US dollar per liter—is a positive development, but its impact on vulnerable population must be carefully considered. Heightened transparency and communication about the use of tax revenue towards improving the environment could help make the reform better accepted by the public. Electricity tariffs must also be reviewed, to account for externalities from energy production, incentivize investment in energy efficiency projects and stimulate private investment, particularly in renewable energy production.

18. Measures to improve the business climate are critical to boost private investment. The government has a key role to play in strengthening policy frameworks to enable private sector participation in support of sustainable growth. Foreign investment is needed, predominantly in large-scale infrastructure projects.

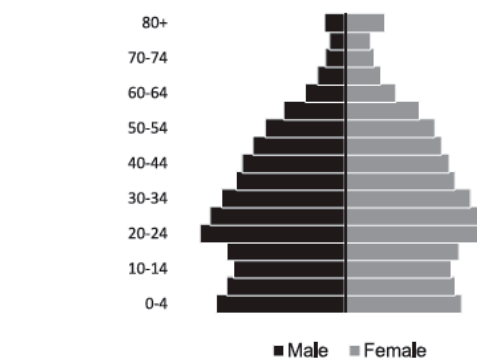
⁶ Getting Energy Prices Right: From Principle to Practice, Heine and others, 2014

DEMOGRAPHICS¹

Vietnam has enjoyed a substantial demographic dividend in the last decades. Going forward rapid projected aging could weigh on economic growth and necessitate social security and fiscal reforms. Managed well, this transition can go hand in hand with the Vietnamese living long, healthy, prosperous, and productive lives.²

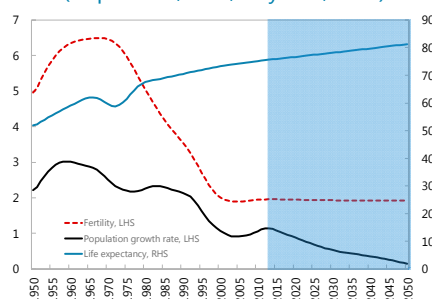
1. Vietnam is a young country, but projected to undergo a demographic transition marked by slowing population growth and aging. Vietnam has a young population (median age of 26) with the largest age cohorts between 20 and 34 (Figure 1). However, declining fertility rates since the early 1970s and to a lesser extent rising life expectancy will lead to an increase in the population's median age (Figure 2).³ The population growth rate is projected to fall close to zero by 2050. The working-age population share peaked in 2013 and is projected to decline over coming decades (Figure 3). The share of the population age 65 and older (old-age population) will increase rapidly, although from low levels, and reach close to 3½ times the current level by 2050.

Figure 1. Vietnam: Population Structure 2014



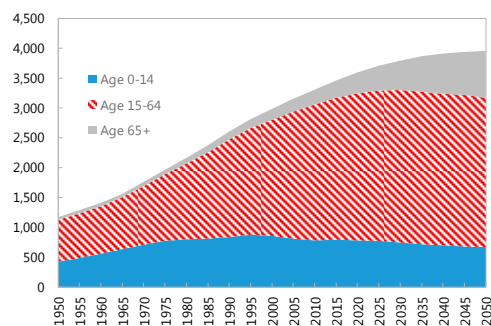
Source: Vietnamese authorities.

Figure 2. Vietnam: Fertility, Life Expectancy, and Population Growth
(In percent, LHS; In years, RHS)



Sources: UN Population Division, *World Population Prospects, 2015 revision*; and IMF staff calculations.
Note: Projections based on the UN's medium fertility variant.

Figure 3. Vietnam: Population by Age Groups
(Millions of Persons)



Sources: UN Population Division, *World Population Prospects, 2015 revision*; and IMF staff calculations.
Note: Projections based on the UN's medium fertility variant.

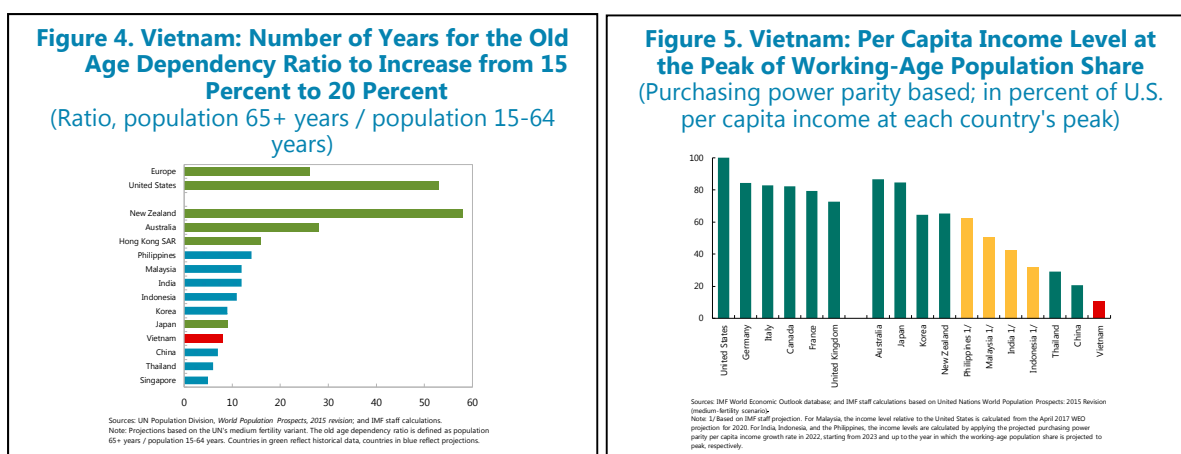
2. Aging in Vietnam is projected to occur fast and at a relatively low per capita income level. Figure 4 shows the number of years it takes for the old-age dependency ratio to increase from 15 to 20 percent. This transition is projected to take only 8 years in Vietnam, a speed of aging similar

¹ Prepared by Jochen Schmittmann (APD).

² See "Golden Aging", World Bank 2015.

³ Vietnam has had population policies advocating a limited number of children since the 1960s. The current policy emphasizes a family size of one to two children.

to other Asian economies. In contrast, the same transition took 26 years in Europe and more than 50 years in the United States. The rapid speed of aging has two implications. First, Vietnam will have less time to adapt policies to a more-aged society than many advanced economies had. Second, Vietnam is at risk of becoming old before becoming rich, or, to put it differently, Vietnam is likely to face the challenges of high fiscal costs of aging and demographic headwinds to growth at relatively low per capita income levels. Figure 5 shows per capita income at purchasing power parity relative to the United States at the historical or projected peak of the share of the working-age population in selected advanced and Asian economies. Among these countries, Vietnam's working age population has reached its peak at the lowest relative per capita income level. All else equal, the contribution of the quantity of labor to growth begins to turn negative following peak working-age population. This underscores the need for Vietnam to sustain high growth rates in the next decades.⁴



3. Demographic trends will turn into headwinds for economic growth. Vietnam has enjoyed a substantial demographic dividend in the last decades that is gradually diminishing and will eventually turn into a drag on growth. Demographic developments affect growth through various channels, including the size of the labor force, productivity, and capital formation. We establish a baseline growth impact of demographic-induced changes in labor force size assuming unchanged total factor productivity (TFP) growth; unchanged age- and gender-specific labor force participation rates (and employment rates); and a constant capital-to-effective-labor ratio.⁵ Labor force size changes are estimated to add close to ½ percentage point to average annual growth between 2020 and 2050 (Figure 6). The growth effect, however, is lower than previously and could fall to zero by mid-century. On a per capita basis, a declining labor force size is estimated to subtract 0.1 percentage points from annual average growth between 2020 and 2050.

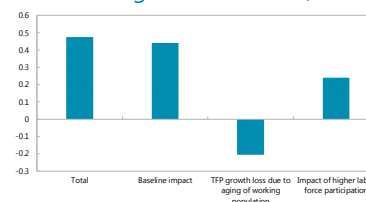
⁴ Vietnam's low per capita income suggests the possibility of continued rapid real convergence through catch up in technology and structural transformation of the economy from low productivity activities, especially in agriculture where 40 percent of the workforce are employed, to higher productivity activities. However, this process is not automatic and requires good policies that facilitate strong productivity growth.

⁵ The estimate is based on a growth accounting framework with capital and labor as inputs. See chapter 2 in the *IMF's Spring 2017 Asia and Pacific Regional Economic Outlook* for methodological details.

4. Productivity growth could be lower with an aging workforce.

Studies suggest that aging has mixed implications for productivity growth. Factors such as accumulation of experience over time, depreciation of knowledge, or age-related trends in physical and mental capabilities all play a role. We estimate the effect of workforce aging (measured by the share of workers 55-65 years old in the total workforce) on productivity for a sample of Asian and European countries.⁶ We find that an increase in the share of older workers is associated with a significant reduction in labor productivity growth. For Vietnam, the share of older workers in the workforce is projected to increase by close to 10 percentage points by 2050. This could reduce growth by 0.2 percentage points per year. The impact of aging may also differ across professions with productivity of workers in physically demanding professions (factory workers, construction, agriculture) declining at older ages, while productivity may increase with age in other professions such as lawyers, managers, and doctors. Vietnam has a high share of its workforce in professions where productivity tends to decline with age (Figure 7). This underscores the importance of structural transformation and moving up the value chain to prepare for an aging workforce.

Figure 6. Vietnam: Baseline Growth Impact of Demographic Trends, Impact of Aging on TFP, and Impact of Higher Labor Force Participation
(Percentage point impact on real GDP growth; average over 2020-50)

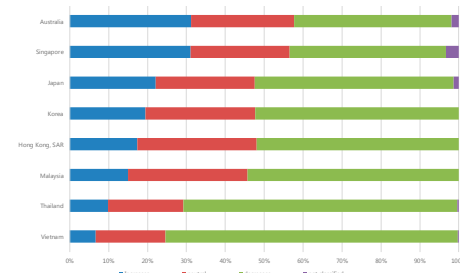


Sources: UN Population Division, World Population Prospects, 2015 revision; Penn World Tables 9.0, and IMF staff calculations.
Note: The baseline estimates are based on the assumptions of unchanged labor force participation by age-gender cohort, constant capital-to-labor ratio, and TFP growth unchanged from historical average. Estimated impact of workforce aging on total factor productivity (TFP) growth follows Ayar and others (2016) based on a sample of Asian and European countries. The rising labor force participation rates scenario is based on the experience of Japan from 1990 to 2015.

5. Labor force participation rates (LFPRs) are already high in Vietnam, but there is ample scope to support growth by reallocating labor to productive activities.

A gradual increase in LFPRs by 6 percentage points by 2050 could increase growth by 0.2 percentage points per year.⁷ That said, LFPRs in Vietnam for men and women are among the highest in the region, limiting the scope for increases. Notwithstanding, there is room to increase female and older worker participation in the labor force, as well as tackling under- and low-productivity employment. The latter is particularly relevant in Vietnam where productivity outside the FDI sector remains very low, informality is high, and 40 percent of the workforce is still employed in agriculture.

Figure 7. Work Force Decomposition by Productivity Impact of Aging
(Percent of total workforce, latest available)



Sources: Staff estimates; ILO classification of job type by aging impact based on Venn (2008).
Note: Category productivity "increases" with age includes: managers, and professionals; Category "neutral" includes: clerical support workers and services and sales workers; Category "decreases" includes: technicians, skilled agricultural, forestry and fishery workers, craft

6. Rapid aging will pose fiscal challenges. Under current policies, age-related public expenditures (pensions and health care) are projected to increase by 8 percentage points of GDP by 2050, more than double the current level.⁸ Most of the increase would be related to pensions. Spending on education could fall with a declining number of young people, but this is unlikely to

⁶ See chapter 2 in the IMF's *Spring 2017 Asia and Pacific Regional Economic Outlook* for methodological details.

⁷ This increase in LFPRs is similar to Japan's experience in the last two decades.

⁸ See Box 2.2 in the IMF's *Spring 2017 Asia and Pacific Regional Economic Outlook*.

fully offset rising age-related expenditures. On the revenue side, lower growth rates because of demographic change could weigh on fiscal revenues.

7. The existing pension system is a defined benefit pay as you go system that covers public sector workers and workers in formal private sector jobs. The system is unsustainable because its generous benefits. Retirement ages, at 60 and 55 for men and women respectively, are low. General and occupational early retirement rules are generous, reducing effective retirement ages and increasing the system's unfunded liabilities. Benefit indexation has regularly exceeded CPI. Accrual rates are high both in international comparison and given an actuarially reasonable internal rate of return on contributions, resulting in replacement rates of 75 percent after 30 and 25 years of service for men and women, respectively. Pension fund reserves are poorly invested, with returns below GDP growth. The pension system is also inequitable across private and public sector employees and across the covered and uncovered population. Land reform to give peasants title to land that can be traded and sold could be an effective old age insurance mechanism for large parts of the rural population.

8. Long-term demographic challenges underscore the need for policies to raise the economy's growth potential and reform the social security system. Vietnam needs to achieve high and sustained growth in the next decades before demographic developments become a significant drag on growth. Faster productivity growth is needed while reducing the factor intensity of growth. Key areas for reform to boost the economy's growth potential and facilitate structural transformation are SOE and banking reforms to achieve a level playing field for the private sector and improve the allocation of capital. Growth-friendly fiscal consolidation is needed to strengthen public finances before rapid aging sets in. On pensions, near-term reforms should raise retirement ages and address early retirement, accrual rates and indexation.

FINANCIAL DEEPENING¹

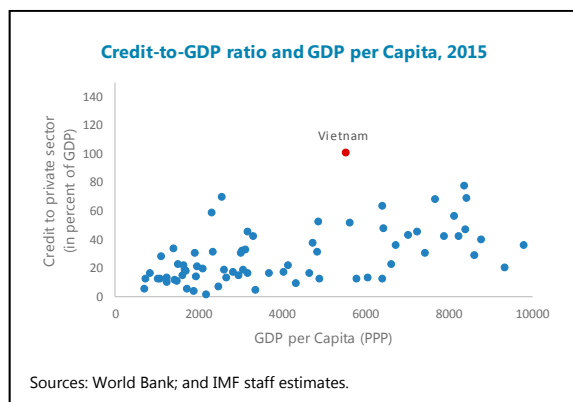
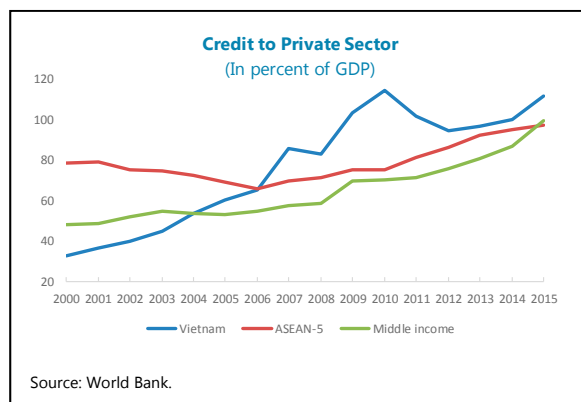
Vietnam's rapid financial deepening since the early 2000s has been punctuated by bouts of instability. The financial system remains bank-centered and dominated by the state, credit growth has been rapid, and the output efficiency of credit has declined, pointing to inefficient allocation. Wide ranging bank reforms are needed to create a level playing field for access to credit; raise the level and efficiency of investment; and increase financial sector resilience. Deeper financial markets and institutions are also critically needed to finance investment, including in infrastructure.

A. Financial Development, Capital Misallocation and Growth

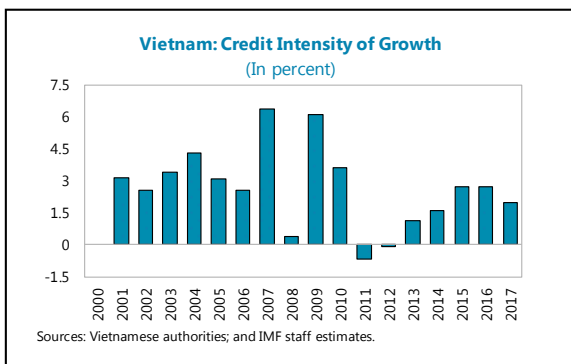
1. **A long literature documents that financial development has the potential to boost economic growth, raise financial and economic inclusion and increase a country's resilience to shocks.** *Gine and Townsend, 2004; Jeong and Townsend, 2007,2008; Amaral and Quintin,2010; Buera et al., 2011; Greenwood et al., 2013* have found sizeable impacts of improved financial intermediation on aggregate productivity and income. *King and Levine, 1993; Levin, 2005;* support by empirical evidence the view that financial deepening spurs economic growth. Financial institutions and markets help to mobilize savings, promote information and risk sharing and improve resource allocation. The diversification and management of risk promotes financial stability to the extent that deep and liquid financial systems with diverse instruments help dampen the impact of shocks.
2. **Vietnam's financial system remains bank-centric and dominated by state-owned banks, while non-bank financial institutions are relatively small and are only now being actively nurtured.** Vietnamese financial system is large for a middle-income country but credit institutions account for the largest share. In 2016, banking sector assets amounted 194 percent of GDP and accounted for more than 96 percent of the financial sector assets (insurance companies: 3 percent; and securities and fund management companies: 1 percent). The four major state-owned credit banks (SOCBs) account for 45 percent of the banking sector assets and provide half of total credit which, despite cutbacks in recent years, remains heavily tilted towards the SOE sector. Stock market capitalization increased to 33 percent of GDP, from 27 percent in 2015. Attracting foreign capital remains challenging due to (i) the lack of diversification of securities products; (ii) the under-developed corporate bonds market; (iii) the large share of state-owned capital in many enterprises; and (iv) the low freedom level of capital mobility and the administrative constraints faced by foreign owners.

¹ Prepared by David Corvino (APD).

3. Vietnam's rapid economic development during the last decade reflects rapid growth in bank credit, including to the private sector. Credit growth has averaged 24 percent in the last ten years. On average, the credit-to-GDP ratio expanded by 4.8 percentage point per annum between 2000 and 2015 and reached 124 percent of GDP at end-2016, exceeding the ASEAN-5, other middle income countries, and significantly exceeding countries at similar levels of development.



4. With rapid credit growth, the productivity of credit and rates of return to investment have deteriorated. The credit intensity of growth has risen, with real credit growing almost three times faster than real GDP. Credit targets—by bank and by sector of activity—remain in effect, creating inefficiencies in the allocation of capital across enterprises, between and within industries. Although the share of SOEs in total credit has declined (15 percent of total in 2016), in line with authorities' plan to reduce state investment in non-core areas, some poor performing SOEs remain highly leveraged. Legacy problems and NPLs remain unresolved, including through regulatory forbearance, and the banks are hampered by low capital ratios. A growing share of loans is going to real estate, financial and personal sectors including mortgages. Real estate investment expanded by 29 percent per year on average in real terms over the last decade while average annual output growth in the sector was a meager 5.2 percent over the same period.²



5. Small and medium enterprises (SMEs) face barriers to credit, adding to the credit misallocation problem. In 2015, according to a survey on Vietnamese enterprises³, access to finance was the main business environment constraint for the SMEs. Only 29 percent of the

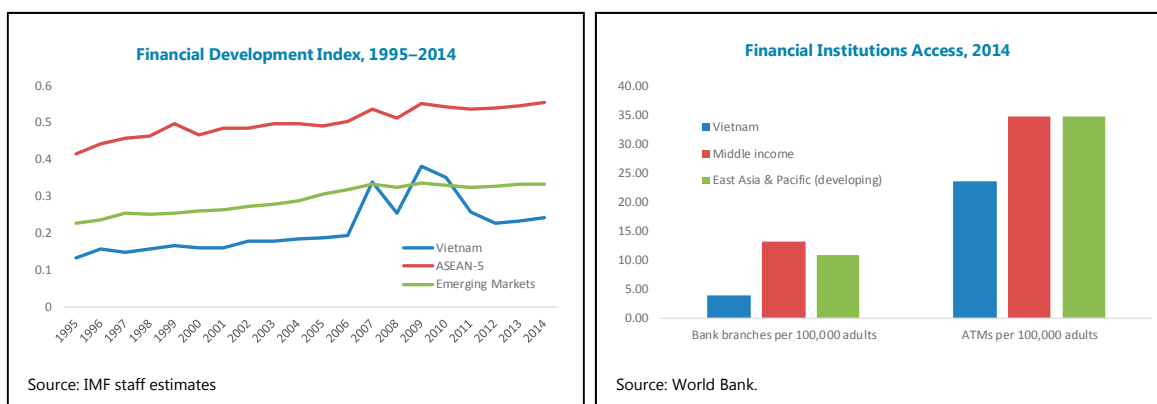
² The World Bank, "Vietnam systematic country diagnostic 2016".

³ The World Bank, Enterprise Surveys, Vietnam 2015.

small enterprises (1–20 employees) have an active line of credit versus 57 percent of large firms (+100 employees). Domestic SMEs compete for credit with SOEs and large domestic enterprises with preferential access to resources. Consequently, their investment is subdued and is largely internally financed.

6. Credit misallocation and SME financing constraints contribute to a low share of investment in GDP (down by 10 percentage points since 2005) and are keeping Vietnam from reaching a higher growth path. The private sector has not benefited from cutbacks in SOE investment and non-state sector investment has stagnated around 12 percent of GDP. Public investment efficiency is hampered by tight fiscal space and lack of coordination in a fragmented general government. Local governments—which now account for about 80 percent of total state budget investment—and SOE tend to select and undertake their own infrastructure projects without employing a strategic approach linked to national priorities.

7. A new financial development index created by the Fund indicates that Vietnam’s financial sector development has improved during the last two decades but remains below emerging markets. The components of the Financial Development Index reveal that Vietnam’s financial depth and efficiency are at its peers’ level for both institutions and markets. However, access to financial institutions is low, owing to the relatively small amount of bank branches and ATMs per capita (respectively 4 and 24 per 100,000 adults).



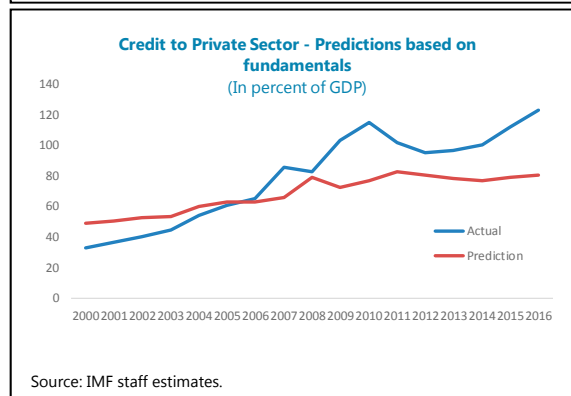
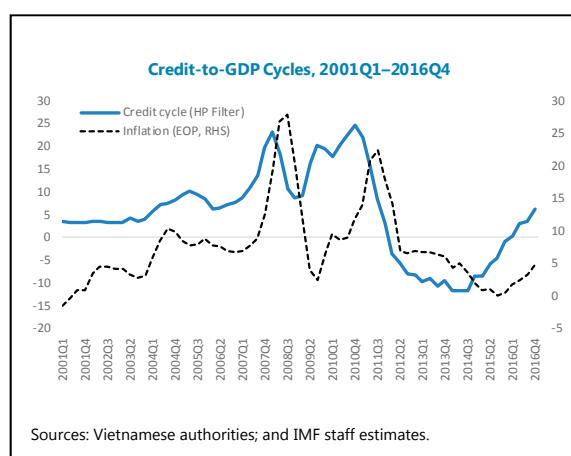
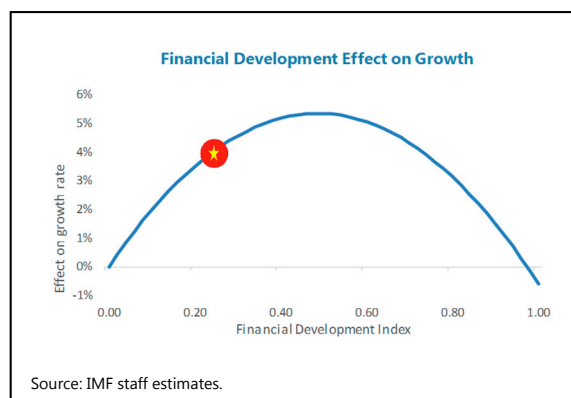
8. Vietnam could benefit from further financial development, improving access to financial services and developing capital markets and institutions. Empirical analysis indicates that there is a bell-shaped relationship between financial development and growth⁴. Financial development increases growth up to a certain point (between 0.45 and 0.7 on the FD index) after which, further development has a negative impact. Research found that the weakening effect on growth at higher levels of financial development can be attributed to financial deepening, rather than to higher access or greater efficiency. In the case of Vietnam, estimates suggest that improving access to financial services to individuals and SMEs could help boost growth by an additional percentage point each year.

⁴ SND15/08 Sahay and others, “Rethinking Financial Deepening: Stability and Growth in Emerging Markets”

B. Credit Growth and Financial Stability

9. Vietnam's credit-to-GDP ratio is now close to levels reached during previous periods of macroeconomic instability, signaling potential risks ahead. Past credit cycles led to deteriorating quality of bank balance sheets and higher inflation. The most recent ones, in 2008 and 2011, were characterized by large shares of credit directed to SOEs and to the real estate sector. They were followed by surges of inflation—over 20 percent—and engendered a sharp rise of NPLs and significant weaknesses in the banking sector, which are still weighing on the real economy.

10. Regression analysis indicates that credit in Vietnam is 40 percent of GDP greater than expected. Specifically, a random-effects regression linking credit to fundamentals and using international panel data was estimated following closely Cottarelli and others (2004)⁵. The fundamentals are: public debt, GDP per capita, inflation, capital account openness, bank regulation indicators, legal origin and a time trend. The coefficients are then applied to Vietnam's fundamentals to determine the expected level of credit to the private sector. The results show that an appropriate level of credit-to-GDP ratio would be around 80 percent and that the gap has widen in recent years.



C. Conclusions

11. Vietnam's economy would reap large benefits from financial sector reforms. Bank and SOE reforms, for instance the phasing out of credit targets, lifting interest rate ceilings and the establishment of a level playing field for access to credit, would improve credit allocation, reduce market distortions and foster private sector investment and productivity. Deeper

⁵ Cottarelli and others, 2004, "Early Birds, Late Risers, and Sleeping Beauties: Bank Credit Growth to the Private Sector in Central and Eastern Europe and the Balkans"

financial markets and institutions are also needed to finance investment, including in infrastructure.

References

- Amaral, P. S. and E. Quintin (2010, 08). Limited Enforcement, Financial Intermediation, And Economic Development: A Quantitative Assessment. *International Economic Review*.
- Buera, F. J., J. P. Kaboski, and Y. Shin (2011, August). Finance and Development: A Tale of Two Sectors. *American Economic Review*.
- Gine, X. and R. M. Townsend (2004, August). Evaluation of financial liberalization: a general equilibrium model with constrained occupation choice. *Journal of Development Economics*.
- Greenwood, J., J. Sanchez, and C. Wang (2013, January). Quantifying the Impact of Financial Development on Economic Development. *Review of Economic Dynamics*.
- Jeong, H. and R. Townsend (2007, July). Sources of TFP growth: occupational choice and financial deepening. *Economic Theory*.
- Jeong, H. and R. M. Townsend (2008, September). Growth And Inequality: Model Evaluation Based On An Estimation-Calibration Strategy. *Macroeconomic Dynamics*.
- King, R. G. and R. Levine (1993, August). Finance and Growth: Schumpeter Might Be Right. *The Quarterly Journal of Economics*.
- Levine, R. (2005, December). Finance and Growth: Theory and Evidence. In P. Aghion and S. Durlauf (Eds.), *Handbook of Economic Growth, Volume 1 of Handbook of Economic Growth*.

CREDIT MISALLOCATION AND ECONOMIC GROWTH IN VIETNAM¹

The legacy of non-performing loans (NPLs), scarcity of funds for recapitalization and resulting credit misallocation between the favored sector (proxied by SOEs) and the rest of the economy (non-SOEs) is an important policy issue in Vietnam, weighing on the efficiency of resource allocation and economic growth. This paper presents a theoretical and empirical analysis of the issue. A simple banking model is embedded in a political economy setting to assess the factors determining the extent of recapitalization and its effects on economic growth. The analysis suggests that the extent of recapitalization depends on an array of factors, including the tightness of the government budget constraint, the productivity of its spending, and concern for the favored sector. Our empirical analysis using corporate data indicates credit misallocation between SOEs and non-SOEs in Vietnam. We also draw lessons for Vietnam from case studies of the international experiences with NPL resolution.

A. Introduction

1. Credit misallocation between private firms and SOEs or other favored enterprises have been observed in other economies transitioning from the centrally planned economy. In China, credit misallocation between SOEs and non-SOEs was pointed out as a main source of low aggregate productivity (Hsieh and Klenow, 2009; Dollar and Wei, 2007). Also, in central and eastern Europe, resolution of credit misallocation between SOEs and non-SOEs was one of the central issues in the transition to market-based economies.²

2. This paper takes up the issue for the case of Vietnam, where, it has been argued, that economic growth is constrained by resource misallocation between State owned enterprises (SOEs) and non-SOEs. In particular, the claim is that commercial banks lend to underperforming SOEs at unnaturally low rates, thus preventing profitable non-SOEs' access to credit and suppressing economic growth via credit misallocation. While there is only limited data about NPLs for SOE lending, it is considered that the soundness of the banking sector in Vietnam has been deteriorated by the weak SOE sector.³

Credit Misallocation and Economic Growth

3. China's experience in the late 1990s implies that the long-term return from resolving credit misallocation is high. China intensified restructuring policies on SOEs and

¹ Prepared by Mitsuru Katagiri (MCM).

² See Appendix V in Maliszewski et al. (2016) for more detail.

³ For instance, IMF (2013) emphasizes the relation between SOE lending and banking sector soundness.

associated NPL problems in the late 1990s, and as a result of the restructuring policies, SOEs' share in total industrial assets dropped from 90% in 2000 to 40% in 2015.⁴ While the SOE reform entailed some short-term economic costs including high unemployment rates, the SOE reform is considered one of the main drivers of China's high economic growth, starting in the late 1990s (Hsieh and Klenow, 2009; Song, Storesletten, and Zilibotti, 2011).

Resolving NPLs by Asset Management Companies (AMCs)

4. International experience suggests that NPL resolution by AMCs such as the Vietnam Asset Management Corporation (VAMC) has some advantages. First, due to *economies of scale*, AMCs make it possible for banks, particularly smaller banks, to resolve NPLs efficiently. Second, considering the *specific expertise* for resolving NPLs, it is efficient for banks to focus on new lending by allowing AMCs to concentrate on NPL resolution.

5. While there is no single optimal solution for NPL resolutions, international experiences indicate common factors that contribute to successful NPL resolution by AMCs.⁵ They include (1) enough legal powers, (2) pricing NPLs at market prices with strict supervisory policies, and (3) ample capital buffers.

6. AMCs should have enough legal powers. For this purpose, proper insolvency systems to facilitate out-of-court workout are important. When the existing legal system is not equipped, the government can grant special legal powers to AMCs.

- Several countries created an enhanced out-of-court framework for NPL resolution (Korea, Thailand, Indonesia, and Malaysia).
- Danahara (Malaysia) can appoint special administrators without having to go to court, and readily foreclose on collateral.

7. Transferring NPLs at market prices is necessary to clarify the cost of NPLs and prevent moral hazard. When it is difficult to compute market values of NPLs, the price should be computed by standardized methods based on recovery rates, cash flow projections, and collateral values. Furthermore, a strict supervisory policy should be simultaneously implemented to encourage prompt recognition of losses incurred by reevaluation.

- Danaharta (Malaysia) established standardized parameters to determine the market value of NPLs, and purchased them at an average discount of 55 percent. For unsecured loans, the market value was 10 percent of the principal amount outstanding. Banks who sold NPLs retained a right to receive 80 percent of recoveries. Asset transfers were not compulsory, but when banks whose NPL ratios were more than 10% refused to sell NPLs, they had to decrease their book value to 80 percent of Danaharta's offered price.

⁴ See Appendix III in Maliszewski et al. (2016) for more detail.

⁵ In what follows, the argument is based on *Ingves et al.* (2004) and *Cerruti and Neyens* (2016).

- KAMCO (Korea) purchases NPLs as 45 percent of collateral value for secured loans and 3 percent on unsecured loans (on average, 35 percent of nominal values). The supervisor instructed banks to separate out nonviable firms, following specific forward-looking criteria and leverage levels.

8. Weak capital buffers make banks reluctant to resolve NPLs. If the bank becomes undercapitalized due to credit losses incurred by NPL resolution, recapitalization by public funds is one option. While purchasing NPLs at above market prices helps recapitalize the banking sector, it conceals the cost of recapitalization from the public.⁶

- Jobst et al. (2016) shows that banks with lower capital adequacy ratios tend to choose smaller provisioning to NPLs in Europe. Similarly, Peek and Rosengren (2005) shows that undercapitalized banks tended to conduct forbearance lending in Japan.
- In China, NPLs were purchased by AMCs at the face values. The NPL resolution in 1999 was effectively financed by both AMC bonds (55 percent) and PBC credit (45 percent). Since the PBC balance sheet suffered due to low cash recovery rates, this is a double act of NPL removal and bank recapitalization (Ma, 2006).

9. Given these international experiences, this paper provides a model and empirical analysis on forbearance lending, credit misallocation, and economic growth. First, it gives a simple model based on the bank's optimization and clarifies the importance of bank's capital buffers for resolving credit misallocation. Second, given the effect of recapitalization, it examines when to carry out recapitalization enough to achieve the first best outcome from a political economy viewpoint. Empirical evidence supporting these theoretical predictions are also provided at last.

B. Banking Model of Credit Misallocation

10. A simple two-sector banking model to understand causes and consequences of credit misallocation is proposed. We extend the Monti-Klein model, where a representative bank has monopolistic powers in lending and deposit markets, by putting particular emphasis on the importance of bank capital buffer to resolve the NPL problems and associated credit misallocation.⁷ After establishing the equilibrium in a banking sector, we investigate the government policy on bank recapitalization from a political economy perspective to understand what can be constraints for the resolution of NPL problems through bank recapitalization.

Bank's Optimization and Equilibrium Behavior

Corporate Sector

⁶ Ingves et al. (2004) criticize such indirect capitalization through AMCs due to its opaqueness while Cerruti and Neyens (2016) take it as one of advantages for NPL resolution by AMCs.

⁷ See, for example, the chapter 3 in Freixas and Rochet (2008) for the prototype Monti-Klein model.

11. Production takes place in two sectors, a high-productivity sector (H sector) and a low-productivity sector (L sector), and requires working capital financed by bank credit.

In each sector $i = h, l$, firms have production functions,

$$y_h = z_h k_h^\theta \quad \text{and} \quad y_l = z_l k_l$$

where y_i is output, k_i is the amount of capital (i.e., credit), and z_i is productivity satisfying $z_l < z_h$. While the H sector's production function is assumed to be decreasing return to scale, $\theta < 1$, as in a standard model, the L sector's production function is assumed to be linear for the analytical purpose. We think of the L sector as representing inefficient, lower productivity SOEs that have a stock of legacy NPLs. The profit maximization by firms in each sector is formulated as

$$\max_{k_h} z_h k_h^\theta - R_{L,h} k_h \quad \text{and} \quad \max_{k_l} z_l k_l - R_{L,l} k_l$$

where $R_{L,h}$ and $R_{L,l}$ are lending rates in each sector.

12. The first order conditions for firms gives the following loan demand functions in the H and L sector.

$$k_h = \left(\frac{R_{L,h}}{\theta z_h} \right)^{\frac{1}{\theta-1}} \quad \text{and} \quad R_{L,l} = z_l$$

These loan demand functions are treated as given for banks when they optimally choose their lending rates.

Bank's Optimization Problem

13. A representative bank lends to firms and invests in riskless bonds by their own equity and deposits. The bank's balance sheet is:

$$k_h + k_l + b = d + e$$

where b is bonds, d is deposits, and e is equity. The bond gives the riskless market return, R_M , which is totally exogenously determined in the model.

14. Given the initial amount of credit to the L sector \bar{k}_l , the bank chooses the amount of NPL resolution. In what follows, we use the amount of NPLs and the amount of credit to the L sector interchangeably. The law of motion for k_l becomes,

$$k_l = (1 - x) \bar{k}_l$$

where x is the fraction of NPLs resolved, which is the bank's choice variable. The resolution of NPLs incurs a loan impairment cost and erodes the bank's equity,

$$e = \bar{e} - \phi x \bar{k}_l$$

where $0 \leq \phi \leq 1$ is the loss given default (LGD) for NPLs. The initial value of capital, \bar{e} , consists of the equity which the bank accumulated until the current period, e^B , and the capital injected by the government, e^G . That is, $\bar{e} = e^B + e^G$, and the bank takes e^G as being beyond its control. The supply of deposits is determined by the following deposit supply function,

$$d = \bar{d}R_D^\epsilon$$

where R_D is the deposit rate and $\epsilon > 0$ is the elasticity of deposit supply.

15. The bank optimally chooses deposit and lending rates as well as the amount of NPL resolution under several constraints including the capital constraint. The bank maximizes the profit,

$$\pi = R_{L,h}k_h + R_{L,l}k_l + R_M b - R_D d$$

by choosing R_L^g, R_L^b, R_d, b , and x , subject to (i) the law of motions for k_l and e given the initial value for NPL, \bar{k}_l , and equity, $\bar{e} = e^B + e^G$, (ii) the budget constraint, (iii) the deposit supply function, (iv) the loan demand functions in each sector, and (v) the capital constraint,

$$e \geq \gamma d.$$

which indicates that the equity-debt ratio must be higher than γ .

Optimal Deposit Rate, Lending Rate, and NPL Resolution

16. The optimality conditions for the bank's maximization problem give the optimal lending rate, deposit rate, and the amount of NPL resolution. First, the deposit rate is,

$$R_D^* = \frac{\epsilon}{1 + \epsilon} R_M.$$

where $\epsilon/(1 + \epsilon)$ is a mark-down for deposit rates. Second, the lending rates in each sector become,

$$R_{L,h}^* = \frac{R_M + \gamma\lambda}{\theta} \quad \text{and} \quad R_{L,l}^* = z_l$$

where λ is a Lagrange multiplier for the capital constraint. Note that the lending rate would be higher when the capital constraint binds, which implies that undercapitalization causes higher lending rates and entails insufficient credit supply. Finally, the optimal amount of NPL resolution in equilibrium, x^* , is determined as,

$$x^* = \frac{e^G + e^B - \gamma(k_h^* + \bar{k}_l)}{(\phi - \gamma)\bar{k}_l} \leq 1$$

where $k_k^* = \left(\frac{R_{L,h}^*}{\theta z_h}\right)^{\frac{1}{\theta-1}}$ and $R_{L,h}^* = \frac{R_M + \gamma\lambda}{\theta}$. An interesting result here is that the equilibrium value of x^* is an increasing function of the capital injection by the government, e^G . Hence, the equilibrium behavior for x^* implies that the capital injection by the government can help the bank resolve more NPLs as investigated in the following comparative statics.

Policy Effects of Recapitalization

17. Given the bank's optimal behavior in equilibrium, the policy effects of recapitalization, e^G , are analyzed by comparative statics. To visually show the result of this exercise, the model parameters are calibrated as follows. The capital ratio must be higher than 9 percent, which means $\gamma = 0.1$, and LGD is 30 percent, $\phi = 0.3$. The NPL in the initial period, \bar{k}_l , is set so that the NPL ratio is equal to 12 percent. Both the market return R_M and the return in the good sector z_h are set to 1.06 based on the average growth rate in Vietnam. Then, the elasticity of deposit demand ϵ and the curvature of production function θ are chosen so that the deposit and lending rate are equal to 5 percent and 9 percent, respectively. The most important and difficult parameter to be set is the return in the bad sector z_l . I set $z_l = 0.7$ for illustration. Note that the quantitative result would depend this value, but the qualitative implication does not change. Finally, the initial value of equity, \bar{e} , is chosen so that the resolution of NPLs is 20 percent without capital injection, $e^G = 0$.

18. The government's recapitalization policy is evaluated by macroeconomic performance and bank's profitability measures. First, the aggregate output, Y , and the aggregate productivity, Z , are defined as

$$Y = y_h + y_l = z_h k_h + z_l k_l$$

and

$$Z = \frac{y_h + y_l}{k_h + k_l}.$$

Note that the aggregate productivity would be increased if the bank credit is more allocated to the H sector because $z_h > z_l$. In other words, the credit misallocation to the L sector lowers the aggregate output via decreasing the aggregate productivity, Z . Second, the bank's profitability is measured by the following net interest margin (NIM) for loans and deposits,

$$NIM = \frac{R_{L,h} k_h + R_{L,l} k_l}{k_h + k_l} - R_D.$$

We investigate macroeconomic consequences of credit misallocation by evaluating the effects on those variables through comparative statics.

19. The equilibrium amount of NPL resolution, x , is increasing with respect to the government's capital injection, e^G (Figure 1-1). This is because, under the capital constraint, the bank needs enough initial capital buffers, $e^B + e^G$, for NPL resolution to absorb the credit losses incurred by the NPL resolution. Otherwise, the NPL resolution would cause a serious capital shortage and consequently force the bank to substantially reduce the amount of credit to meet the capital requirement.

20. This equilibrium relationship between bank capital and NPLs implies that the government can facilitate the resolution of NPLs. The government can help the bank resolve more NPLs through increasing recapitalization by public funds, e^G . Since the full NPL resolution

($x = 1$) would be realized at some point as the capital injection by the government, e^G , continues to increase, we will discuss the policy implication of recapitalization separately between (i) the second-best case (i.e., partial NPL resolution, $x < 1$), and (ii) the first-best case (i.e., full NPL resolution, $x = 1$).⁸

The Case of Partial NPL Resolution ($x < 1$, the second best)

21. In the partial NPL resolution case, credit misallocation entails some growth cost by lowering aggregate productivity. Since the banking sector is still undercapitalized, it cannot resolve all NPLs. As shown in the equilibrium amount of credit across the two sectors (Figure 1-2), while the credit to the L sector proportionally decreases as the bank's capital buffers increase, some firms in the L sector continue operating thanks to forbearance lending in this case. Given the fact that $z_h > z_l$, the credit misallocation due to undercapitalization lowers aggregate productivity compared with the case of full NPL resolution.

22. Unless NPLs are fully resolved, credit to the H sector would be constant with respect to recapitalization (Figure 1-2). In the model, when $x < 1$, the Lagrange multiplier for the capital constraint is constant at,

$$\lambda = \frac{R_M(1 - \phi) - z_l}{\phi - \gamma} > 0.$$

Therefore, the equilibrium lending rate and the amount of credit are also constant with respect to e^G . Intuitively, this is because, when the bank faces undercapitalization due to the credit costs incurred by NPL resolution, the bank would not extend new loans toward the H sector but keep it constant under the constraint that it must keep its capital ratios at the required level.

23. During the process of NPL resolution, aggregate output Y is slightly decreasing with respect to recapitalization (Figure 1-3). This result simply comes from the fact that the bank decreases their lending to the L sector, while it does not increase their lending to the H sector. In other words, the model implies that, in the process of NPL resolution, while the aggregate productivity would improve due to the normalization of credit allocation, the aggregate output would slightly decrease due to the decrease in the total amount of credit, unless NPLs are fully resolved.

24. The NIM would increase as recapitalization proceeds (Figure 1-4). While deposit rates are constant, the bank's asset return is increasing due to the normalization of credit allocation in their loan portfolio. That is, when the bank has enough capital, it improves its profitability by moving credits from the L sector to the H sector. Since the profitability is an important factor to attract outside investors, this result implies that recapitalization is possibly effective to attract new equity including foreign investors.

⁸ There is also no NPL resolution case (i.e., $x = 0$) when the bank's capital buffer is very thin. This case is, however, so extreme that we do not consider this case hereafter.

The Case of Full NPL Resolution ($x = 1$, the first best)

25. In the first best case, a complete shutdown of credit to the low-productivity sector is realized. This is because the bank fully recognizes and resolves NPLs with full bank recapitalization and no capital scarcity. There are two subcases in the first best case. The first subcase is that NPLs are fully resolved but the capital constraint is still binding (i.e., $x = 1$ and $\lambda > 0$), and the second subcase is that NPLs are fully resolved and the capital constraint is slack due to ample capital buffers (i.e., $x = 1$ and $\lambda = 0$).

26. After completing the NPL resolution, credit to the high-productivity sector would increase along with recapitalization (Figure 1–2). When $x = 1$ is realized, the Lagrange multiplier becomes,

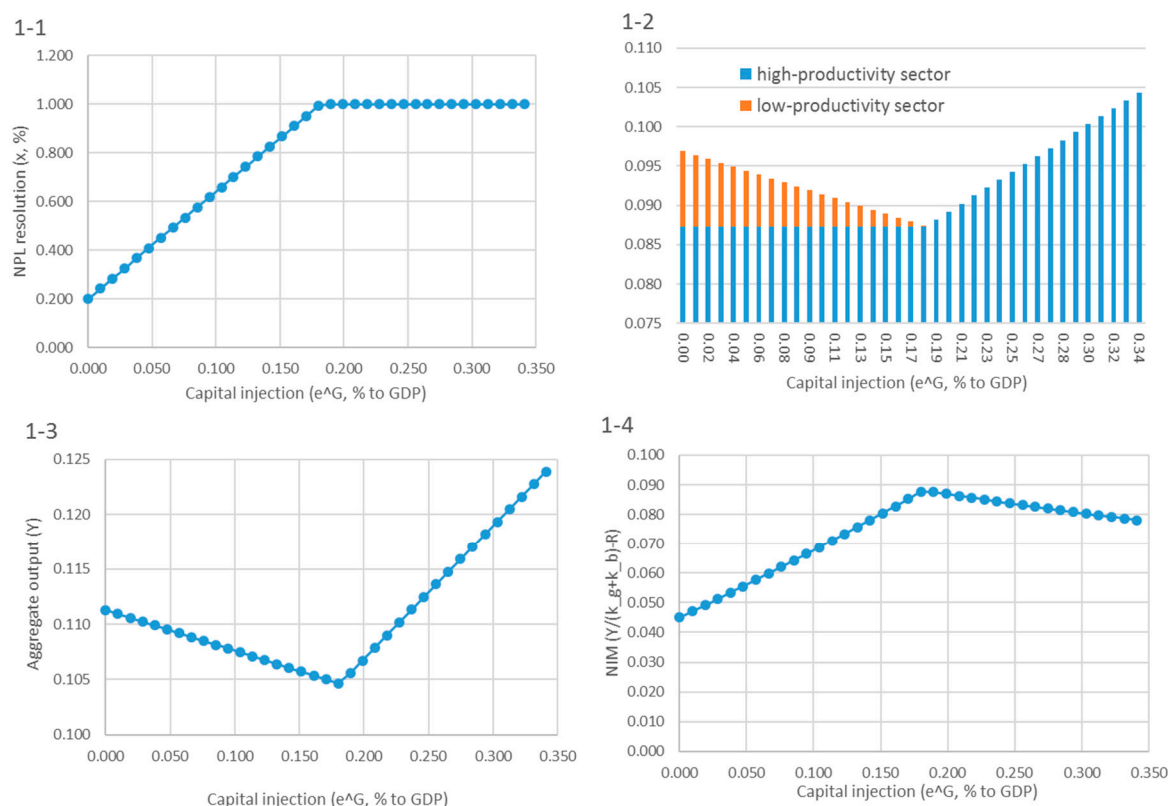
$$\lambda = \frac{\theta^2 z_h}{\gamma^\theta (e^G + e^B - \phi \bar{k}_l)^{1-\theta}} - \frac{R_M}{\gamma}$$

which is obviously a decreasing function of e^G . Hence, given the fact that the equilibrium lending rate $R_{L,h}^*$ is decreasing with respect to λ , the lending rate and credit to the H sector k_h would also increase along with an increase in e^G . Intuitively, this result indicates that once the bank completes its NPL resolution, it does not have to use capital buffers for absorbing the credit losses incurred by NPL resolution, but can use them for extending new lending. Because of the decline in lending rate $R_{L,h}^*$, the bank's profitability measured by NIM would decline along with recapitalization (Figure 1–4).

27. On the back of the increase in credit, the aggregate output would increase along with recapitalization after completing the NPL resolution (Figure 1–3). Since Y is slightly decreasing with respect to e^G when $x < 1$, the response of Y to e^G becomes a V-shaped function with respect to e^G , which is kinked at $x = 1$ as shown in Figure 1–3. This result implies that credit misallocation suppresses economic growth not only through lowering aggregate productivity but also through disturbing high-productivity firms' access to credit.

28. As the amount of recapitalization continues to increase, the capital injection becomes ineffective for boosting output eventually. This is because the capital constraint becomes slack due to ample capital buffers at some point. In this case, since the Lagrange multiplier λ is constant at zero, all variables including lending rates, the amount of credit, output, and profitability measures are constant with respect to e^G . Hence, from a policy perspective, the government has no incentive to inject more capital into the banking sector once the capital constraint becomes slack.

Figure 1: Policy Effects of Recapitalization



Sources: IMF staff estimates.

Government Policy on Optimal Amount of Recapitalization

29. The government's optimal decision on the amount of recapitalization is modeled as a political economy equilibrium. Given the equilibrium in a banking model above, the process of policy making is formulated as a two-stage game between the government and the bank. In this game, the government faces the following budget constraint,

$$T = e^G + G,$$

where T is the tax revenue, e^G is the amount of recapitalization, and G is other government expenditures. Then, given the above budget constraint and the bank's optimization in the second stage, the government decides on the amount of recapitalization e^G in the first stage to maximize the following social welfare function,

$$U = Y + \alpha y_l + \beta f(G)$$

where Y is the aggregate output, y_l is the output in the low-productivity sector, and $f(G)$ is the social welfare from government expenditures, which satisfies $f'(\cdot) > 0$ and $f''(\cdot) < 0$. The parameters α and β , which represent the relative importance of y_l and $f(G)$ in the social

welfare, are interpreted that: (i) a high α means that the government has a special interest to support the low-productivity sector, namely SOEs, and (ii) a higher β means that the government considers other government expenditures (infrastructure, social security etc.) as important expenses.

30. The optimal amount of recapitalization can be either of the following three cases: (i) zero capitalization ($e^G = 0$), (ii) partial capitalization ($e^G > 0$ and $\lambda > 0$), and (iii) full capitalization ($e^G > 0$ and $\lambda = 0$). The cases (i) and (iii) are characterized as corner solutions, while the case (ii) is characterized as an inner solution in which the first order condition $\partial U / \partial e^G = 0$ is satisfied. Since the government has no incentive to increase e^G once the capital constraint becomes slack (i.e., $\lambda = 0$), the case (iii) corresponds the case that the government chooses the minimum amount of e^G which brings $\lambda = 0$.

31. The government's optimal choice is computed by the following sequential procedures. First, try to compute e^G which satisfies the following first order condition (FoC),

$$\frac{\partial U}{\partial e^G} = \frac{\partial Y}{\partial e^G} + \alpha \frac{\partial y_l}{\partial e^G} - \beta f'(T - e^G) = 0.$$

and defines the value of e^G as e^{G*} . If we cannot find e^G satisfying the FoC because we have $\partial U / \partial e^G < 0$ for all e^G , then the government's optimal choice has a corner solution of zero capital injection, $e^G = 0$. Given the fact that $\partial y_l / \partial e^G < 0$ and $f'(T - e^G) < 0$, this corner solution is more likely to be chosen when the value of α and/or β are large. Also, if we cannot find it because we have $\partial U / \partial e^G > 0$ even when the capital constraint becomes slack (i.e., even when the Lagrange multiplier λ reaches zero), then define e^{G*} as the minimum value of e^G which brings $\lambda = 0$. The other corner solution is more likely to be chosen when we have a large β . Once we can find e^{G*} , then compare the level of social welfare under $e^G = 0$ with that under $e^G = e^{G*}$. Define the social welfare in each case as U^0 and U^* , respectively. Then, we have

$$U^0 = Y^0 + \alpha y_l^0 + \beta f(T) \quad \text{and} \quad U^* = Y^* + \beta f(T - e^{G*})$$

where Y^0 and Y^* are aggregate output realized in the second stage under $e^G = 0$ and $e^G = e^{G*}$, and y_{low}^0 is the low-productivity sector's output under $e^G = 0$. Note that since NPLs are fully resolved and $x = 1$ both in the full capitalization case ($\lambda = 0$) and in the partial capitalization case ($\lambda > 0$), we have $y_l^* = 0$. The government will choose the zero recapitalization, $e^G = 0$, if

$$U^0 - U^* = (Y^0 - Y^*) + \alpha y_l^0 + \beta \{f(T) - f(T - e^{G*})\} > 0,$$

and choose, $e^G = e^{G*}$, if $U^0 - U^* < 0$.

32. The political economy equilibrium suggests that the NPL resolution by public recapitalization depends on the social welfare function. First, since we can show $y_l^0 > 0$ and $f(T) > f(T - e^{G*})$, the above optimality condition implies that a higher value of α and β makes it difficult to realize the NPL resolution by recapitalization. In other words, NPL resolution by public recapitalization will not take place if the government has special interests to help the low-productivity sector, namely SOEs, (i.e., high α), or if it considers other government

expenditures including infrastructure and social security as more important expenses than recapitalization of the banking sector, (i.e., high β). Second, since we assume that $f(G)$ is concave (i.e., $f''(G) < 0$), we have $\partial(U^0 - U^*)/\partial T = f'(T) - f'(T - e^{G*}) < 0$. This implies that when the government has an ample tax revenues (i.e., when T is high), then the government tends to choose capitalization by public money.

C. Credit Misallocation and SOEs in Vietnam

33. In addition to the theoretical investigation, credit misallocation is empirically examined by corporate data in Vietnam. The dataset is the annual data from Worldscope, which contains all listed firms' financial data, during 2005–2015. For regression analysis, the following variables are defined.

dum_soe = 1 if the state share is more than 10 percent, and dum_soe = 0 otherwise.

roa = EBIT/total asset

roa_soe = dum_soe*roa

intr = interest expenses/total debt

d_debt = Year-on-year growth rate of total debt

Then, the existence of credit misallocation between SOEs and non-SOEs is empirically examined.⁹

34. First, the difference in loan rates between SOEs and non-SOEs is examined. For this purpose, we run,

$$\text{int}_t = \beta_0 + \beta_1 \text{dum_soe} + \text{controls}$$

The control variables include roa_{t-1} , roa_t , and log of total assets. The estimation result shows that $\beta_1 = -0.0044$ (t value: -2.30). Hence, it shows that SOEs obtain credit at lower rates on average even after controlling for profitability and firm size.

35. Second, the relationship between loan rates and profitability is examined. To examine whether loan rates are lower for SOEs at the ex-ante and/or ex-post stage, we run

$$\text{int}_t = \beta_0 + \beta_1 \text{roa}_{t-1} + \beta_2 \text{roa}_t + \beta_3 \text{roa_soe}_{t-1} + \beta_4 \text{roa_soe}_t + \text{controls}$$

The control variables include log of total assets, the growth rate of total asset, and year dummies. Also, fixed effects for each firm are included. If SOEs obtain credit at lower rates, we will have $\beta_3 > 0$ (ex-ante) and/or $\beta_4 > 0$ (ex-post). In addition to the estimation using a whole

⁹ Before the estimation exercise, the data cleaning is conducted as follows. First, I drop data for the industries of Telecommunications, Utilities, and Financials (ICB: 6000-9000) because their financial strategy is different from others. Second, if the sample hits at least one of the following criteria, it is removed as an outlier. (1) roa is more than 99% tile or less than 1% tile. Then, roa is in $[-0.17, 0.38]$, (2) intr is negative or more than 40%, (3) d_debt is more than 100%, (4) d_ta is more than 50%.

sample, the sub-sample estimation using same specification for “good firms” (those with ROA higher than the median) and “bad firms” (those with ROA lower than the median) are conducted.

36. On the relationship between loan rates and profitability, it is observed that unprofitable SOEs obtain credit at lower rates in the ex-ante stage (Table 1). While the relationship between loan rates and profitability is negative on average, this relationship is significantly biased to positive (i.e., $\beta_3 > 0$) for unprofitable SOEs (SOEs in the bad firm sample), which implies that underperforming SOEs obtain additional loans at lower loan rates.

Table 1. Vietnam: Loan Rates and Profitability

Dependent Variable: inter_t

	all firms	good firms (above median)	bad firms (below median)
roa_{t-1}	-0.064***	-0.154***	-0.111*
roa_t	0.148***	0.216***	0.105**
roa_soe_{t-1}	0.015	0.030	0.183**
roa_soe_t	0.050	-0.043	0.069

Source: IMF staff estimates.

Note: *, **, *** indicate that the coefficient is significant at 10 percent, 5 percent, and 1 percent level.

37. Third, the relationship between loan growth and profitability is examined. If unprofitable SOEs obtain forbearance lending, the relationship between loan growth and profitability, which normally has positive correlations, would be negatively biased and become ambiguous. To examine this hypothesis, we run

$$\text{d_debt}_t = \beta_0 + \beta_1 \text{roa}_{t-1} + \beta_2 \text{roa_soe}_{t-1} + \text{control}$$

The control variables include total asset, year dummies, and fixed effects for each firm. If the forbearance lending to SOEs is carried out, we will have $\beta_2 < 0$.

38. The estimation result for the relationship between loan growth and profitability implies forbearance lending to SOEs. Table 2 shows that the relationship is clearly positive for all firms on average (i.e., $\beta_1 > 0$) in the whole sample estimation as well as the subsample

Table 2. Vietnam: Debt Growth and Profitability

Dependent Variable: d_debt_t

	all firms	good firms (above median)	bad firms (below median)
roa_{t-1}	0.731***	0.693	1.768***
roa_soe_{t-1}	-0.800**	-1.421*	-1.252**

Source: IMF staff estimates.

Note: *, **, *** indicate that the coefficient is significant at 10 percent, 5 percent, and 1 percent level.

estimation, which means that profitable firms increase their debt to expand their businesses while unprofitable ones decrease their debt to shrink their businesses. However, for SOEs (particularly for SOEs in the bad firm sample), this relationship is biased to negative compared with private firms (i.e., $\beta_2 < 0$), and no clear relationship between loan growth and profitability is observed for SOEs (i.e., $\beta_1 + \beta_2$ is close to zero). This implies that some SOEs obtain forbearance lending even with their underperforming profitability.

D. Conclusion and Policy Implications

39. This paper argues that the extent of bank recapitalization is a political economy equilibrium. The political trade-off for recapitalization reflect the extent of the government's concern (special interest) for the favored, low-productivity sector, and the tightness of its budget constraint. Partial or full bank recapitalization may be the selected policy response depending on an array of factors. The first-best, consisting of fast NPL resolution and full recapitalization, raises the quality of credit allocation and growth relative to the second-best, partial recapitalization outcome. The first-best requires a government budget that is not too tight (marginal cost of funds below a certain threshold), highlighting the importance of fiscal space for financial stability. An empirical analysis supports the importance of the policy regarding credit misallocation between SOEs and non-SOEs in Vietnam.

References

- Dollar, David and Shang-Jin Wei (2007): "Das (Wasted) Kapital: Firm Ownership and Investment Efficiency in China," *IMF Working paper*, 07/9
- Cerruti, Caroline and Ruth Neyens (2016): "Public Asset Management Companies: A Toolkit," A Worldbank Study
- Freixas, Xavier and Rochet J. C. (2008): *Microeconomics of Banking*, The MIT press
- Hsieh, Chang-Tai, and Peter J. Klenow (2009): "Misallocation and Manufacturing TFP in China and India," *Quarterly Journal of Economics*, 124(4), 1403-1443
- He, Dong (2004): "The Role of KAMCO in Resolving Nonperforming Loans in the Republic of Korea," *IMF working paper*, 04/172
- International Monetary Fund (2013): *Vientnam – Financial System Stability Assessment*
- Ingves, Stefan, Steven A. Seelig, and Dong He (2004): "Issues in the Establishment of Asset Management Companies," *IMF policy discussion paper*, 04/3
- Jobst, Andreas, Anna Ilyina, Dermot Monaghan, Dmitriy Kovtun, Jose M Garrido, Kenneth H Kang, Marina Moretti, Shekhar Aiyar, Wolfgang Bergthaler and Yan Liu (2016): "A Strategy for Resolving Europe's Problem Loans," *IMF staff discussion notes*, 15/19
- Peek, Joe and Eric S. Rosengren (2005): "Unnatural Selection: Perverse Incentives and the Misallocation of Credit in Japan," *American Economic Review*, 95(4), 1144-1166
- Maliszewski, Wojciech, Serkan Arslanalp, John Caparusso, José Garrido, Si Guo, Joong Shik Kang, W. Raphael Lam, T. Daniel Law, Wei Liao, Nadia Rendak, Philippe Wingender, Jiangyan Yu, and Longmei Zhang (2016): "Sharing China's Bank Restructuring Bill," *IMF working paper*, 16/203
- Ma, Guonan (2006): "Resolving China's Corporate Debt Problem," *China and World Economy*, 14(3), 19-37
- Song, Zheng, Kjetil Storesletten, and Fabrizio Zilibotti (2011): "Growing Like China," *American Economic Review*, 101(1), 196-233