

CONJONCTURE

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Banking in a low interest rate environment: the case of Portugal

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Thomas Humblot

Sustainable and inclusive growth: the role of cities

Cities today concentrate more than half of the world population and more than 80% of global GDP. The underlying dynamics explaining their ever increasing importance are the result of a variety of positive externalities (thicker labor markets, knowledge spillovers, input sharing...) generating self-reinforcing effects. These rapid waves of urbanization have key implications for the production of goods and services, environmental quality and human development. The world is one of density spikes and disparities, driven by the unstoppable ascendance of metropolises. Greener and more inclusive cities should be promoted in order for them to remain livable. In this respect, public policies have an important role to play.

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William De Vijlder



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Banking in a low interest rate environment: the case of Portugal

Thomas Humblot

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The five major Portuguese banking groups¹ returned to profitability in 2018 thanks largely to a faster decline in interest expense than interest income, and to the reduction in operating expenses and the cost of risk. Costs were reduced as part of the macroeconomic adjustment programme that Portugal negotiated with the European Commission, the European Central Bank (BCE) and the International Monetary Fund (IMF) in April 2011². In exchange for the authorisation of a EUR 78 billion credit line, only a third of which has been disbursed (EUR 26 billion), Portugal had to carry out reforms whose main objectives were to restore a sustainable fiscal policy, resorb internal and external imbalances and stabilise the financial sector. Portugal exited this adjustment programme in June 2014.

The financial sector was stabilised in part through recapitalisation of several banks, including Millennium BCP (Banco Comercial Português), Banco BPI and Banco Internacional do Funchal (Banif), for a total of EUR 6 billion. Caixa Geral de Depósitos was also recapitalised for EUR 1.6 billion during the adjustment programme, but the Portuguese government is the sole shareholder. The former Banco Espírito Santo was split up in August 2014, after the end of the adjustment programme, and its good part was renamed Novo Banco.

The stabilisation of Portugal's financial sector was not accompanied by a major consolidation movement within the banking system. According to ECB figures, the number of banks in Portugal declined from 162 in September 2010 to 149 in November 2019. There were no major mergers or acquisitions during this period either. The relatively mild consolidation of the Portuguese banking system recently is mainly a reflection of the previously high level of concentration. Over the past decade, a relatively high and stable share of the total consolidated assets of the domestic banking system (about 80%) has been held by

the five major Portuguese banks³. This high degree of concentration can be attributed to a previous period of consolidation initiated in the mid-1980s, and that was amplified when the European Economic Community's second banking directive was transposed into Portuguese law⁴. Currently, 32 universal and commercial banks dominate the market in terms of total assets, compared to 86 mutual agricultural credit banks (*caixas de crédito agrícola mútuo*). Portuguese banks are largely geared towards the retail banking business, which involves granting loans, collecting deposits and providing payment services on behalf of a clientele of individuals, professionals and small & mid-sized enterprises.

A study of recent profit and loss account trends for the major Portuguese banks shows some of the effects that low interest rates are having on a banking system geared mainly towards retail banking activities and variable-rate loans. The decline in the outstanding amount of bank loans was offset by an increase in the net interest margin, which can be attributed to a faster decline in interest expense than interest income. Other things being equal, the decline in interest rates also helped reduce the cost of risk, which in 2018 returned to the pre-2007 level. The non-performing loan ratio was halved from the Q2 2016 peak, thanks to a similar-sized reduction in the non-performing loan outstanding amount. Although profitability is still low, solvency ratios have continued to improve thanks to the reduction in risk-weighted assets. The period of low interest rates temporarily improved the overall situation of the major Portuguese banks. In the medium term, however, "low for long" interest rates are bound to have a less favourable impact on the dynamics of banking income and risks, especially given the prospects of an economic slowdown.

¹ Listed by total consolidated assets in 2018: Caixa Geral de Depósitos, Millennium BCP (Banco Comercial Português), Santander Totta, Novo Banco (ex-Banco Espírito Santo) and Banco BPI

² European Commission, 2011, *The economic adjustment programme for Portugal*, Directorate-General for Economic and Financial Affairs, Occasional Papers 79, June

³ By size of assets in 2018, Portugal's third and fifth major banks are both subsidiaries of Spanish banks. Santander Totta is a subsidiary of Banco Santander SA, and Banco BPI has been a fully-owned subsidiary of CaixaBank since end 2018.

⁴ Second Council Directive 89/646/CEE of 15 December 1989, which amends directive 77/780/CEE, aims to co-ordinate the laws, regulations and administrative provisions relating to the taking up and pursuit of the business of credit institutions.



A faster decline in interest expense than interest income helps stabilise operating income

For the five major Portuguese banks, operating income has been fairly stable since 2017 (see table 1). After declining for eight consecutive years, it levelled off at EUR 6.5 billion in 2018⁵, compared to EUR 6.8 billion in 2017. From a historical perspective, however, this is still relatively low: operating income surpassed EUR 10 billion between 2007 and 2010 after several years of growth. Annualised operating income for the first three quarters of 2019⁶ has been roughly the same. For Portuguese banks, the stabilisation of operating income is essentially due to the continuous growth of net interest income since 2015.

Declining returns on assets and loan outstanding amount have reduced interest income

Under the ECB's accommodating monetary policy, there has been a regular reduction in the interest rates applied to non-financial private sector lending in Portugal since 2012. Yet lower interest rates were not accompanied by an increase in the outstanding amount of bank loans, which has declined by nearly a third over the past ten years.

Historically low interest rates for non-financial private sector lending

Other things being equal, the currently low level of interest rates has helped reduce the interest income of Portuguese banks. With the exception of new household overdraft rates, the rates applied to all other new loans have generally declined since April 2012. In September 2019, they were almost all at the lowest levels reported during the observation period (see chart 1).

Theoretically, at constant loan outstanding amounts, interest income declines as new loans with lower yields replace existing loans and account for an ever bigger share of bank balance sheets. For the Portuguese banks, the unfavourable impact of low interest rates on interest income was reinforced by the high proportion of variable-rate loans. Contractually, variable-rate loans must be adjusted downwards, further reducing the interest income banks receive on loan outstanding amount. On average, 85% of the new loans granted to resident households for house purchase, between September 2009 and September 2019, were variable-rate loans. This compares to an average of 26% for the euro area, 14% for Germany and 6% for France⁷. In a banking system making greater use of fixed-rate loans, the impact

⁵ Rounded off from EUR 6,549,570,000.

⁶ It is possible to compare operating income with previous years given the low seasonal nature of most of the items on the profit and loss account of Portuguese banks. Given its exceptional nature, Q4 2018 was excluded from our calculations.

⁷ For the most part, loans granted to non-financial corporates (NFC) are variable-rate loans, regardless of the country under consideration.

of a decline in interest rates on interest income would depend more on the duration of the loan portfolio: the longer the duration, the longer the adjustment period over which the bank's interest income could adjust to lower interest rates.

Interest rates on new bank loans to the NFCs' decrease overall

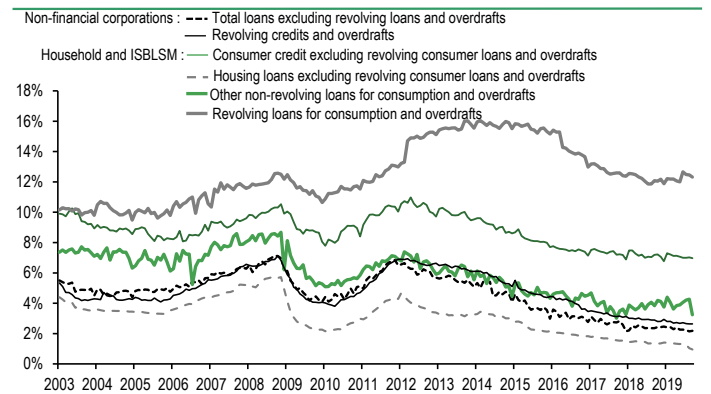


Chart 1

Source : ECB, BNP Paribas

The outstanding amount of bank loans to the non-financial private sector have declined by nearly a third in ten years

After peaking at EUR 264 billion in June 2011, the outstanding amount of bank loans to the non-financial private sector have contracted by 29%, to EUR 188 billion in May 2019. This is comparable to the October 2005 level (see chart 2). Clearly, lower interest rates did not trigger a volume effect during the period. The main two explanations are the sharp deterioration in the cyclical environment and the initially high level of household indebtedness (see below).

In Portugal, the decline in the outstanding amount of bank loans to the non-financial private sector is largely due to the decline in loans to non-financial corporates (NFC). Between June 2011 and May 2019, the outstanding amount of loans to NFC declined by 41%, from EUR 122 billion to EUR 71 billion.

Outstanding loans to the non-financial private sector reduced to its 2005 level

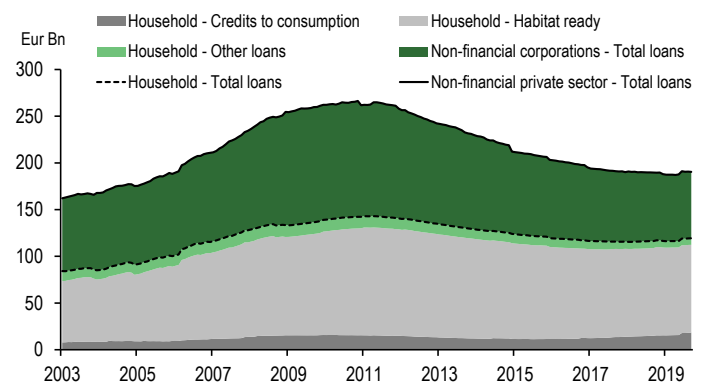


Chart 2

Source : ECB, BNP Paribas



Aggregated profit and loss account of the five major Portuguese banking groups

Million euro	2013	2014	2015	2016	2017	2018	2019e*
Net banking income	7 310	6 672	7 016	6 187	6 789	6 550	6 790
o/w Net interest income	3 697	3 402	3 602	3 895	4 121	4 372	4 500
o/w Net fee and commission income	2 491	1 969	2 036	1 956	2 042	2 115	2 125
o/w Other operating income	1 121	1 301	1 378	337	626	63	164
Total operating expenses	-4 984	-4 065	-4 250	-4 008	-3 830	-3 962	-3 514
o/w Personnel expenses	-2 679	-2 232	-2 357	-2 048	-2 081	-2 033	-2 086
o/w Other operating expenses	-2 305	-1 833	-1 893	-1 960	-1 749	-1 929	-1 428
Gross operating income	2 326	2 608	2 766	2 180	2 959	2 588	3 276
Cost of risk	-4 177	-3 346	-2 940	-4 966	-2 827	-955	-1 455
Net income before tax from continuing operations	-1 851	-738	-174	-2 786	132	1 633	1 820
Profit or loss from discontinued operations	-34	268	658	-83	-748	-29	329
Corporate income tax	-467	257	197	-1 223	897	1 116	713
Other nonrecurring income and expenses	0	0	0	47	25	53	18
Minority interests	250	316	342	316	124	166	143
Net income	-1 668	-1 044	-55	-1 915	-1 613	375	1 310

* 2019 data is estimated with this of the first three quarters

Table 1

Source: BNP Paribas calculations

Over the same period, the outstanding amount of loans to households declined by 18%, from EUR 143 billion to EUR 116 billion. Automatically, bank loans to NFC as a share of the outstanding amount of total bank loans to the non-financial private sector declined to 38% in May 2019 from 46% in June 2011.

Since June 2019, the growth of loans to households (both for house purchase and consumption) has exceeded the ongoing decline in NFC loans. As a result, the outstanding amount of loans to the non-financial private sector rose mildly. The increase in loans to households as a share of total loans to the non-financial private sector might contribute to the reduction of the volatility of the interest income of Portuguese banks. This is because loans to households are less sensitive to cyclical fluctuations than loans to NFC.

Bank intermediation declines as a share of NFC indebtedness

The decline in the outstanding amount of bank loans to NFC was not offset by greater use of the bond market. Like bank loans, the outstanding amount of debt securities issued by NFC also diminished between June 2011 and May 2019. The outstanding amount of NFC debt securities dropped from EUR 40 billion to EUR 29 billion. Since this 30% decline was smaller than the decline in the outstanding amount of bank loans, debt securities increased as a share of total NFC indebtedness (narrowly-defined). As a result, financial intermediation for resident NFC decreased from 75% in Q2 2011 to 71% in Q2 2019. Bank intermediation was thus lower than the euro area average, which at the same dates came to 85% and 76%, respectively.

Loans to households for house purchase recently picked up again

Loans for house purchase, which are almost exclusively mortgage loans, accounted for 79% of the outstanding amount of total bank loans to resident households in September 2019. This figure has remained relatively stable throughout the observation period (starting in January 2003). Since October 2018, the outstanding amount of loans for house purchase has increased moderately, halting the decline observed between November 2011 and September 2018 (a cumulative 18% decline). During this period, the outstanding amount of loans to resident households for house purchase diminished continuously, from EUR 114 billion to EUR 94 billion. This decline might seem surprising given the observed decline in lending rates. Yet it can be explained to a certain extent by the preponderance of variable-rate loans, which reduce the incentive for households to borrow when rates are low (compared to a system of predominantly fixed-rate loans).

The recent increase in the outstanding amount of loans for house purchase was accompanied by a 379% increase in the 12-month moving average of new loans for house purchase between September 2014 (EUR 184 million) and September 2019 (EUR 880 million). After virtually stagnating at historically low levels (see chart 3), new loans for house purchase returned to the June 2008 level of EUR 1161 million. Yet this figure still falls far short of the July 2007 peak of EUR 1875 million. Lastly, new loans cumulated over 12 months grew at



an average annual rate of 37% between September 2014 and September 2019.

The dynamic momentum of new loans for house purchase cannot be attributed to buybacks or renegotiations, which remain low in Portugal (since December 2014, they have accounted for 9% of new loans on average, compared to 34% in France). Given the low proportion of fixed-rate loans, only a small fraction of loans are potentially affected by such operations.

New production of real estate loans to households increases by 379% in 5 years

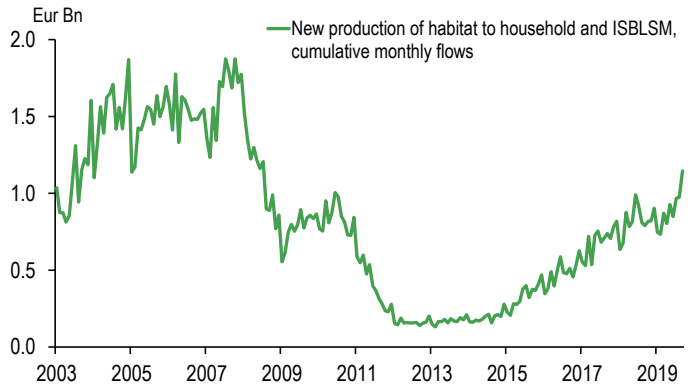


Chart 3 Source: ECB, BNP Paribas

Bank of Portugal recommendations could scale back this trend

Since 1 July 2018, the Bank of Portugal “recommends”⁸ that credit institutions authorised to lend within its jurisdiction set several limits on their business⁹. According to the national central bank, these recommendations aim in part to reduce the incentives for some banks to ease their lending standards in order to create a volume effect to offset the squeeze on margins, due notably to greater competitive pressures and low interest rates. They are also designed to reduce the indebtedness ratio of resident households, who might be attracted by currently low lending rates, although this phenomenon is not yet reflected in the figures (see above, outstanding amount of loans to households).

Inversely, the household indebtedness ratio¹⁰ has dropped off sharply in recent years, bringing it closer to the euro area average (95% and 94%, respectively, in Q2), after widening constantly between 2000 and 2007 (see chart 4). The household indebtedness ratios for Portugal and Spain have followed very similar trajectories, in line with their respective cyclical environments. In the Bank of Portugal’s first recommendation, banks are requested to limit the loan-to-value ratio (LTV) on new loans for primary residences to 90% of the value of the purchased or built real estate asset.

⁸ A recommendation is not legally binding. However, banks must comply with it or justify their position, otherwise the Bank of Portugal could take prudential measures against them.

⁹ Bank of Portugal, *Macroprudential measure within the legal framework of credit for consumers*, 1 February 2018

¹⁰ Loan outstanding amounts as a share of gross disposable income adjusted for changes in the amount of shares that households hold in pension funds.

Household debt ratio in a few Eurozone countries

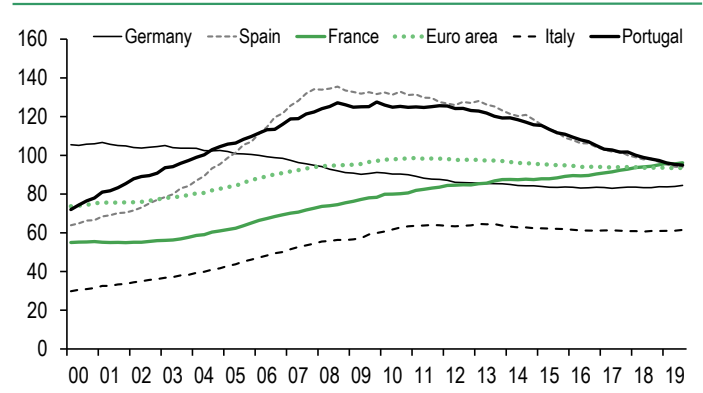


Chart 4 Source: ECB, BNP Paribas

Between July 2018 and March 2019¹¹, the share of new loans for house purchase with a LTV ratio of more than 90% was virtually nil, compared to about 20% previously. As a result, the share of total new loans for house purchase with a LTV ratio of between 80% and 90% more than doubled to about 45%. In contrast, the share of new loans with a LTV ratio of less than 80% declined by more than 10 percentage points over the same period. The average LTV ratio seems to be in the process of converging at between 80% and 90%.

The Bank of Portugal’s second recommendation is to limit the debt service-to-income ratio (DSTI) by limiting the amount of monthly payments to 50% of the borrower’s monthly income¹². The DSTI ratio must take into account all loans already contracted by the borrower as well as the potential upturn in interest rates given the preponderance of variable-rate loans. The proportion of new loans for house purchase with a DSTI ratio of less than 50% rose to 89% in March 2019 from 77% in July 2018. The level of data aggregation prevents us from getting a more precise picture of the breakdown of new loans for house purchase with a DSTI ratio of less than 50%.

Third, the Bank of Portugal is asking banks to limit the original maturity of new loans for house purchase to 40 years. The recommendation aims at reducing the average maturity of new loans for house purchase to 30 years by the end of 2022. In comparison, the original maturity of loans for house purchase in France averaged 20.4 years in September 2019. In Q1 2019, the original maturity in Portugal was 32.7 years, compared to 33.7 years in Q1 2018¹³. Although the recommendation seems to be paying off, the outstanding amount of loans for house purchase with an original maturity of more than 30 years was the only category to progress in Q2 2019 (+3.5%) while those with an original maturity of less than 30 years declined sharply (-10.3%). These two trends have intensified since they first appeared in September 2017. The original maturity of new loans for house purchase is thus converging on 30 years due to both the shortening of longer maturities and the prolongation of maturities of less than 30 years.

¹¹ Most recently available observation period. Bank of Portugal, 2019, *Macroprudential recommendation on new credit agreements for consumers – Progress report*, May 2019

¹² Net annual income divided by 12.

¹³ Bank of Portugal, 2019, *Relatório de acompanhamento dos mercados bancários de retalho* - 2018



Fourthly, the Bank of Portugal recommends that banks avoid grace periods to borrowers on payments of principal and interest, whenever possible. Through payment extensions, however, banks can offer greater flexibility to borrowers experiencing temporary troubles, thereby avoiding a “credit event” whenever possible, and an increase in the cost of risk. To our knowledge, there is no data that can be used to evaluate the impact of this recommendation.

Interest expense has fallen due to the decline in bank funding costs and a change in the structure of liabilities

The decline in interest expense for the major Portuguese banks can be attributed to the decline in the overall bank funding costs and the change in bank liabilities in favour of less costly funding.

Bank funding costs continued to decline

In 2018, the interest paid by Portuguese banks on refinancing operations with central banks as a share of the outstanding amount of such loans (the implicit interest rate) reached a historically low level of -0.2%. The implicit rate was negative for the first time since 2014, the first available observation date for this data series. This bank funding is comprised mostly of liquidities issued from the second targeted longer-term refinancing operations (TLTRO), which explains why the average refinancing rate is negative. The cost of debt securities issued by banks also fell from 4.3% in 2014 to 2.4% in 2018.

The customer deposit rate also fell to 0.4% in 2018 from 1.5% in 2014. Deposit rates are downwardly rigid because banks are reluctant to pass on rates at the zero lower bound or that are negative to retail customers¹⁴, not only for commercial reasons, but also because customers can easily convert part of their deposits into cash. In Portugal, regulations also ban the application of negative interest rates on both households and non-financial companies¹⁵. Persistently low interest rates clearly limit the effectiveness of monetary policy.

Moreover, in a negative interest rates environment, a high loan-to-deposit ratio tends to become a handicap whereas it was rather advantageous when rates were more positive. As the Bank of Portugal points out¹⁶, Portuguese banks managed to reduce their loan-to-deposit ratio by 42% in ten years, with a big reduction in the dispersion of ratios between banks.

Customer deposits make up more than two thirds of the liabilities of Portuguese banks

Household and NFC deposits comprise a growing share of the total liabilities of Portuguese banks, and this percentage rose to 67% in December 2018 from 46% in December 2008. The uninterrupted increase in this proportion since 2009 can be attributed to the increase in the outstanding amount of customer deposits (+17% between 2010 and 2018) while the outstanding amounts of other types of bank funding contracted. Given the decline in their opportunity cost, time deposits

have been largely replaced by sight deposits according to the latest Bank of Portugal figures¹⁷. Arbitraging by depositors helps explain the decline in the implicit interest rate on customer deposits over and beyond the decline in money market rates.

After peaking at more than 11% in 2012, the share of central bank refinancing steadily ebbed until it reached only 5.3% of the liabilities of Portuguese banks in 2018. All in all, the outstanding amount of liquidities obtained by the Portuguese banking system under the LTRO programmes was about EUR 18 billion at October 2019. Consequently, Portuguese banks should make only limited use of TLTRO III for the sole purpose of replacing the credit lines obtained under TLTRO II (which ran from June 2016 to March 2017), which reach maturity in June, September and December 2020 and in March 2021.

The TLTRO programmes also enabled the major Portuguese banks to improve their liquidity coverage ratio (LCR). They were able to use certain sovereign debt securities to increase their reserves with the central bank, which are eligible as high quality liquid assets (HQLA), the numerator of the LCR. The change in the structure of bank liabilities enabled them to reduce the opportunity cost linked to the ownership of HQLA. Within the European Union, the Portuguese banking system has one of the highest average regulatory liquidity coverage ratios. After an 84bp increase since Q4 2016, the average LCR culminated at 227% in Q1 2019, compared to 153% for the EU banking system as a whole.

Net interest margin widens

The net interest margin for Portugal's major banks has increased as interest expense declined faster than interest income. Moreover, given the volatility of revenues generated by market activities and the relative weakness of net commissions, neither can be envisioned as a new source of growth to replace net interest income, at least not in the short term.

Interest expense fall more rapidly than interest income

Between 2014 and 2018, the net interest margin of the major Portuguese banks rose from 1.2% to 1.7%, which is higher than the average for the European Union banking system as a whole (1.4% in 2018¹⁸). The net interest margin continued to widen in the first three quarters of 2019, lifted by the decline in interest expense at a time when interest income was showing signs of levelling off (see chart 5).

The impact of interest rate fluctuations on the net interest margin depends on the respective duration of banking assets and liabilities. Theoretically, the net interest margin rises during phases of falling interest rates because bank funding can be replaced more rapidly by other less costly resources than assets can be replaced by lower-yielding ones. This phenomenon is naturally linked to the traditional activity of maturity transformation. The cost of funding for Portugal's major banks has adjusted more rapidly to the decline in interest rates than the return on assets, even though the preponderance of variable-rate loans means that returns fall more rapidly than if they were fixed-rate instruments.

¹⁴ In Portugal, there are no regulated savings accounts comparable to the Livret A in France, for example.

¹⁵ Bank of Portugal, 2009, *Carta-Circular n° 33/2009/DSB*, 23/03/2009

¹⁶ Bank of Portugal, 2019, *Financial Stability Report*, June 2019

¹⁷ Bank of Portugal, 2019, *Financial Stability Report*, June 2019

¹⁸ EBA Risk Dashboard – Data as of Q2 2019



Lastly, the positive impact of a higher net interest margin on net interest income neutralised the negative effect arising from the decline in the outstanding amounts of bank loans. Net interest income for the major Portuguese banks grew at an average annual rate of 6.5% between 2014 and 2018, from EUR 3.4 billion to EUR 4.4 billion. In Q3 2019, the year-on-year increase in net interest income was 8.8%. In comparison, net interest income for the euro area's 183 biggest banks rose only 0.4% over the same period.

Interest expenses are falling faster than revenues

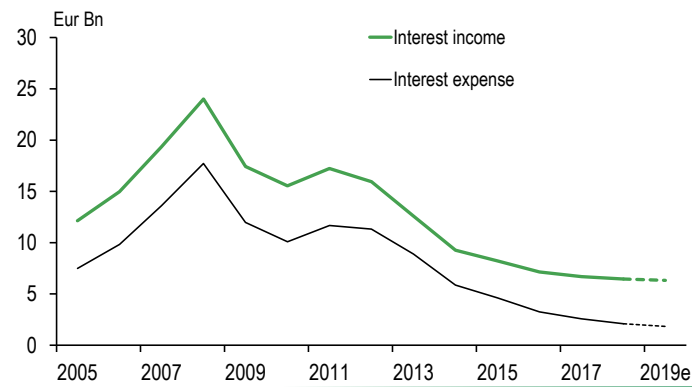


Chart 5 Source: SNL, BNP Paribas

Portuguese banks have increased their dependence on net interest income

Net interest income as a share of operating income for the major Portuguese banks has increased steadily since 2005. In 2018, this proportion reached an all-time high of 67% (compared to 51% in 2005). The breakdown of the different types of revenues (interest, commissions, gains or losses on financial instruments, etc.) is generally better balanced for the larger banks compared to their smaller competitors. Although the increasing share of net interest income can be largely explained by the decline in other revenues, less diversity in terms of the types of revenue increases the major Portuguese banks' dependency on interest income, which has been declining over the past several years.

Nonetheless, net commissions collected by the major Portuguese banks continued to increase in 2018 (+3.6% year-on-year, vs +4.4% in 2017). Yet this positive trend is not yet strong enough to serve as a new source of growth to replace net interest income. At an annualised EUR 2.1 billion in 2019, net commissions still fell short of the 2010 peak of EUR 2.8 billion.

Hit by a bout of weakness in 2018, other income amounted to only EUR 63 million, down from EUR 2.6 billion in 2005. This sharp drop is mainly due to the decline in income generated by market activities. Between 31 December 2017 and 31 December 2018, for example, CGD reported an 85% decline in net trading income¹⁹. Similarly, in 2018 Novo Banco reported a net trading loss of EUR 242 million after a net gain of EUR 179 million in 2017. These losses can be attributed to the Nata project, under which Novo Banco sold some of its assets to a

consortium of funds managed by the American KKR and the Luxembourg-based LX Investment Partners²⁰.

Tight cost controls

Net banking income for the major Portuguese banks has levelled off thanks to cutbacks in the cost of funding. Yet net income increased is due to cutbacks in total operating expenses and the cost of risk.

The major Portuguese banks cut total operating expenses by 31% in 10 years

Portuguese banks were forced to make major adjustments in the wake of the troubles experienced during a series of crises in 2007-2008 and then in 2010-2011. As a result, total operating expenses were reduced by 31% on average between 2006-2008 and 2016-2018 (see chart 6). Cutbacks in personnel costs and other operating expenses contributed to this decline, with cuts averaging 34% and 27%, respectively, between 2006-2008 and 2016-2018. Tight cost controls offset the decline in operating income. As a result, the major Portuguese banks have managed to maintain their cost-to-income ratio at an average of about 60% since 2005, although small improvements can be seen in 2018 and so far in 2019 as well.

Outstanding lending to the non-financial private sector has been reduced to its 2005 level

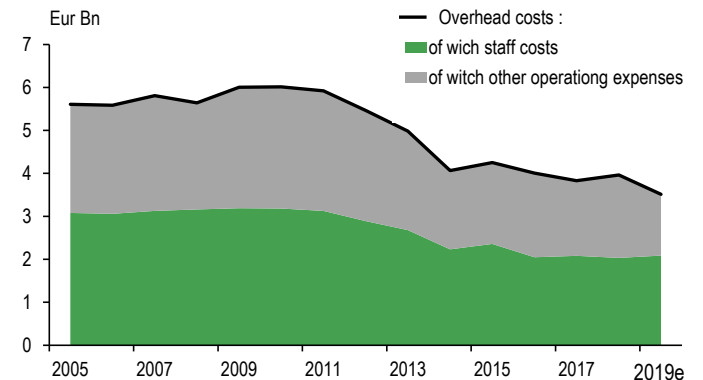


Chart 6 Source: SNL, BNP Paribas

Personnel expenses continued to fall in 2018

Like most of the other euro area countries, the Portuguese banking system has scaled back capacity over the past ten years. Bank staff in Portugal was reduced by 19% between 2008 and 2018, compared to 17% for the euro area banks as a whole.

Personnel expenses for the major Portuguese banks continued to decline to EUR 2 billion in 2018, from a 2009 peak of EUR 3.2 billion. Most of these cutbacks occurred between 2011 and 2014, although they continued at a slower pace between 2015 and 2018.

¹⁹ Caixa Geral de Depósitos, 2018 annual report

²⁰ Novo Banco, 2018 annual report



The decline in other operating expenses helped keep total operating expenses under control

Other operating expenses, including rent, advertising expenses and costs pertaining to information and communications technology, did not decline quite as fast as personnel expenses. Even so, the number of Portuguese bank branches was reduced by 35% between 2008 and 2018, compared to a euro area average of 27% for the same period. As the Bank of Portugal points out²¹, the intensification of digitalisation plans and investments by Portuguese banks undoubtedly helped drive up other operating expenses. Novo Banco, for example, set up a “digitalisation circle” to transform the group by focusing more on customers, streamlining procedures and reducing risks²². The bank also pooled together its main digital sector skills and expertise within an internal entity called “Novo Banco Digital” in 2018. On 4 December 2019, Caixa Geral de Depósitos director Maria João Carioca announced that the group intended to invest EUR 200 million over 5 years to accelerate the bank’s digital transformation.

Compared operating coefficients of some European banking systems

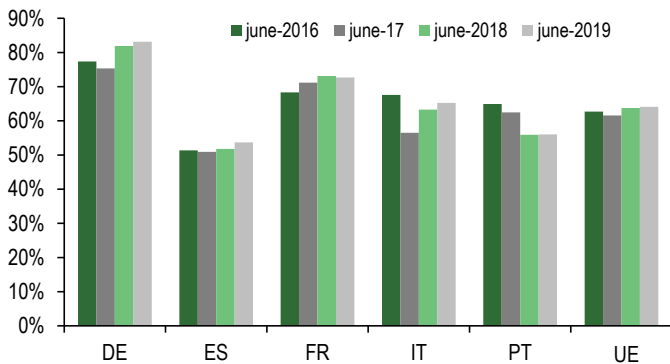


Chart 7 Source: ECB, BNP Paribas

Lastly, the cost-income ratio of Portuguese banks improved slightly in 2018 and has continued to improve so far in 2019 (see chart 7) after fluctuating around an average of 60% since 2005. It is now lower than the average cost-to-income ratio for the EU banking system as a whole. In this respect, the major Portuguese banks stand apart from the average of the major EU banks as a whole, whose cost-to-income ratio has tended to erode since 2017. Yet the divergent trajectories between banking systems must be kept in perspective: the decline in income from corporate and investment banking activities probably contributed to the deterioration in the cost-to-income ratios of banking systems that rely more heavily on these activities to generate a their income.

In 2018, international activities made a large contribution to the net income of the major Portuguese banks

Thanks to the lower bank funding costs and tight cost controls, the major Portuguese banks swung into positive territory in 2018 for the first time since 2010, with net income of EUR 375 million. This is still far short of the 2005-2007 average of EUR 2.6 billion. In the first three

²¹ Bank of Portugal, 2019, *Financial Stability Report*, June 2019
²² See Novo Banco, 2018 annual report

quarters of 2019, net income for the five major Portuguese banks remained positive thanks to the reduction in Novo Banco losses.

Net profit of the major Portuguesees banks, between reduction of domestic losses and increase of the result of activities abroad

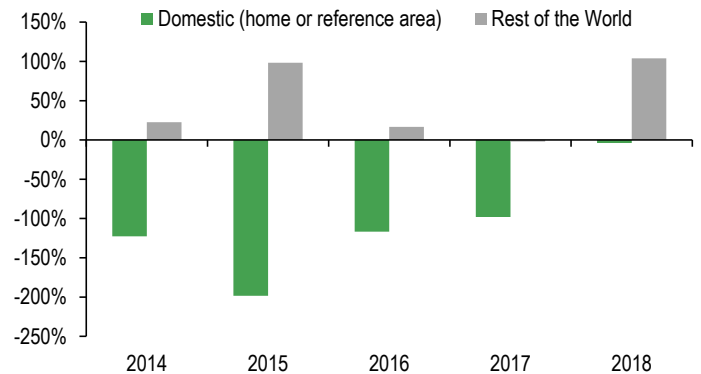


Chart 8 Source: Financial communications of banks, BNP Paribas

International activities made a big contribution to the consolidated net income of the major Portuguese banks (see chart 8). The main international markets are Spain and France, where Caixa Geral de Depósitos and Novo Banco are very active. Millennium BCP has a bigger foothold in Poland and Mozambique. BPI has a major subsidiary in Angola, where Caixa Geral de Depósitos and Novo Banco also have operations. Though a Portuguese-speaking country, Brazil is not a significant market for Portuguese banks. Although international activities make a positive contribution to the consolidated net income of Portuguese banks, this contribution is bound to diminish if they go ahead with plans to sell-off non-strategic assets. In 2018, Novo Banco sold off its activities in Venezuela, Italy, and Cape Verde, and Caixa Geral de Depósitos has put several subsidiaries up for sale, including in Brazil and Spain.

The return on equity improved in 2019 but remains low

The return on equity for the major Portuguese banks was naturally positive in 2018, although it remains low. The weighted average return on equity was 1.5% during the year (see chart 9), whereas it surpassed 15% prior to 2008. It was also much lower than the average return for the other large EU banks in 2018. In 2019, in contrast, the big Portuguese banks began to approach the euro area average.

International comparison of financial profitability of major banks in several EU countries*

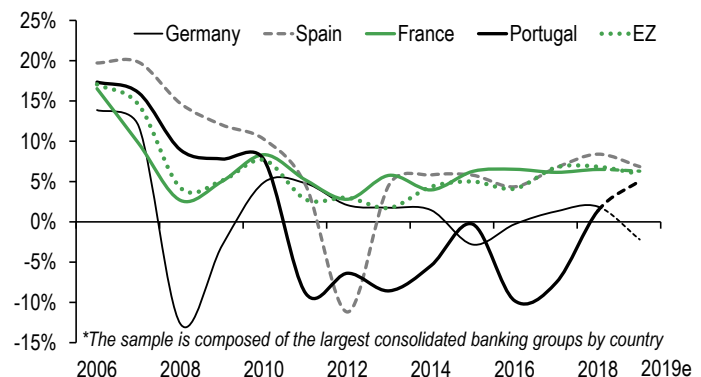


Chart 9 Source: SNL, BNP Paribas

In the short term, however, the adjustments that had to be made during the crisis years should continue to strain the returns of the major Portuguese banks. In the longer term, these cost adjustments should help increase returns, although their impact could be delayed by slower growth and a persistently accommodating monetary policy for many more quarters.

Lower interest rates helped reduce risks

All things being equal, low interest rates have reduced the cost of risk for the major Portuguese banks and helped clean up their balance sheets. The reduction in the cost of risk helped limit the erosion of equity capital, but it still declined. The regulatory solvency ratios of the major Portuguese banks improved essentially because risk-weighted assets declined faster than equity capital.

Non-performing loan ratios and outstanding amounts continue to decline

The cost of risk²³ for the major Portuguese banks dropped from a peak of EUR 5.6 billion in 2011 to EUR 1 billion in 2018 (see chart 10). It has now fallen below the 2007 level of EUR 1.1 billion. The temporary upturn in 2016 can be largely attributed to Caixa Geral de Depósitos' plan to clean up its balance sheet. Excluding CGD, the cost of risk for the major Portuguese banks would have declined continuously between 2012 and 2018. Changes in the cost of risk at Novo Banco (formerly BES) largely determined the dynamics for all of the major Portuguese banks. Novo Banco was largely responsible for the general downward trend in 2016, but also for the upturn in the first three quarters of 2019.

Along with the decline in the cost of risk, the non-performing loan ratio was halved for the major Portuguese banks, from a peak of 20.1% in Q2 2016 to 8.9% in Q2 2019. Even so, the NPL ratio is still nearly three times higher than the average for the main EU banks (see chart 11).

Evolution of the cost of risk of Portuguese banks

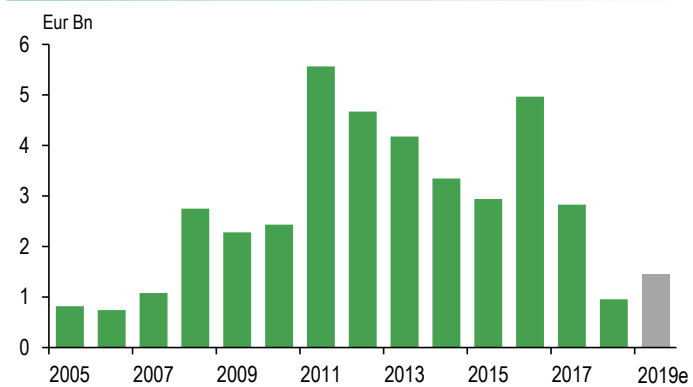


Chart 10 Source: SNL, BNP Paribas

²³ Impairment allowances and reversals, amounts recovered on impaired loans and losses on non-recoverable loans.

International comparison of non-performing loan ratios

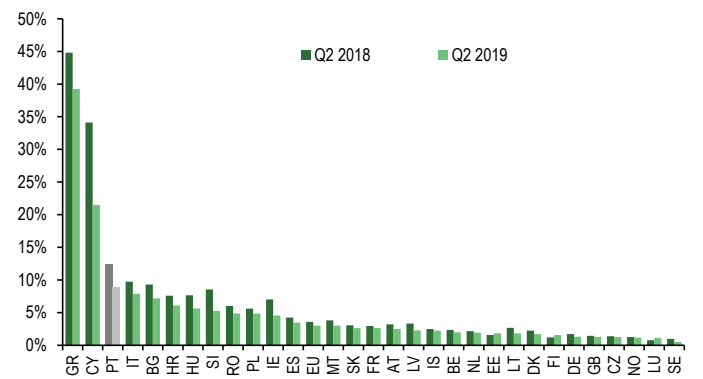


Chart 11 Source: BAE, BNP Paribas

According to Bank of Portugal figures²⁴, the decline in the NPL ratio is mainly due to a reduction in the outstanding amount of non-performing loans (the ratio's numerator). The outstanding amount of NPL was halved, from EUR 50 billion in Q2 2016 to approximately EUR 25 billion in Q1 2019. Over the same period, the outstanding amount of total bank loans (the ratio's denominator) contracted by 8%. This means that the decline in the NPL ratio was not due to dilution but to the clean-up of bank balance sheets.

The tightening of bank lending conditions in 2011/2012²⁵, which were maintained thereafter, helped reduce the cost of risk for Portuguese banks. Lower interest rates also eased the solvency requirement that weighed on borrowers in the repayment process.

Bank balance sheets were largely cleaned up through sales and securitisations

Sales and securitisations of non-performing loans were one of the main channels for cleaning up the balance sheets of Portuguese banks in 2018. These operations reduced the NPL ratio by 1.7 percentage points during the year²⁶. Their cumulative total reduced the NPL ratio by 2.9 percentage points from the Q2 2016 peak. As part of Project Sertorius, for example, Novo Banco sold off EUR 488 million in non-performing real-estate loans to Cerberus Capital Management at 33% of its gross book value in August 2018. The price is comparable to the ones paid for other sales in Spain and Italy, although it naturally depends on the quality of the loan portfolio being sold. Novo Banco is also conducting Nata 2, which should lead to the sale of another non-performing loan portfolio by the end of 2019²⁷. Given the planned amount of the disposal (EUR 3.3 billion initially), this operation should have a significant impact on Novo Banco's non-performing loan ratio, and to a lesser extent, on the NPL ratio of the entire Portuguese banking system.

²⁴ Bank of Portugal, 2019, *Financial Stability Report*, June
²⁵ Bank of Portugal, 2012, *Bank Lending Survey*, January 2012 and Bank of Portugal, 2011, *Bank Lending Survey*, October 2011
²⁶ The range of banks covered by Bank of Portugal data is broader than that of EBA data. This also explains the slight differential between the two NPL ratios.
²⁷ Novo Banco, 5 September 2019 press release

Write-offs have reduced the non-performing loan ratio of Portuguese banks by 3 percentage points since the 2016 peak, including 1 point during the year 2018. At 31 December 2018, the total reduction in the NPL ratio was 8.5 points, which means that write-offs have been the main channel so far for cleaning up the balance sheets of Portuguese banks, ahead of sales and securitisations. Yet the relative contribution of write-offs to the decline in the NPL ratio has gradually decreased while that of sales and securitisations has increased. These trends suggest that Portuguese banks initially cleaned up their balance sheets by selling their most deteriorated exposures with the highest provision ratios and lowest valuations. Thereafter, they sold and/or securitised their less deteriorated non-performing exposures with higher valuations. The breakdown may have been determined in part by the time it takes to set up sales and securitisation operations. In addition, low interest rates may have influenced the growing use of sales and securitisations, because all things being equal, a reduction in the discount rate increases asset value.

The net flow of non-performing loans, i.e. the difference between new non-performing loans and non-performing loans reclassified as performing, plus impairment and repossession, contributed to 1.8 percentage points of the total decline in the NPL ratio. Lastly, dilution arising from the flow of performing loans made only a small, 0.8-point contribution to the decline in the NPL ratio of Portuguese banks.

Portuguese banks are expected to continue cleaning up their balance sheets in the quarters ahead, notably because some have been required to submit NPL reduction plans to the Bank of Portugal. Moreover, the introduction of accounting standard IFRS 9 on 1 January 2018 could increase the cost of risk when a cyclical slowdown is expected. This accounting standard recognises expected credit losses (and not only incurred credit losses as was the case under the previous IAS 39 standard), as well as minimum coverage requirements for non-performing exposures imposed by the European Commission and the ECB's "supervisory expectations for prudential provisioning"²⁸. As a result, the Portuguese banks' situation may seem to have deteriorated even without an intrinsic deterioration in the quality of their portfolio.

Better loss absorbing capacity

The major Portuguese banks have strengthened their capital adequacy ratios despite low profitability and the clean-up of balance sheets. Ongoing clean-up efforts, however, are likely to further strain bank equity. Moreover, under certain conditions, the fiscal treatment of deferred tax assets (DTA) provides the major Portuguese banks with additional loss absorbing capacity equivalent to 15% of their CET1, without it counting as equity capital.

Despite low profitability, Portuguese banks have nearly doubled their capital ratios over the past 5 years

Regulatory capital ratios for the major Portuguese banks have increased since 2014. They had a fully-loaded Common Equity Tier 1 (CET1) ratio of 13.2% in Q2 2019, up from 7.9% in Q3 2014. Despite this significant improvement in the solvency of the major Portuguese banks, it still falls short of the weighted average CET1 ratio for the major

EU banks as a whole, which came to 14.4% and 11.3%, respectively, at the same dates (see chart 12).

International comparison of CET1 ratios of major EU banks

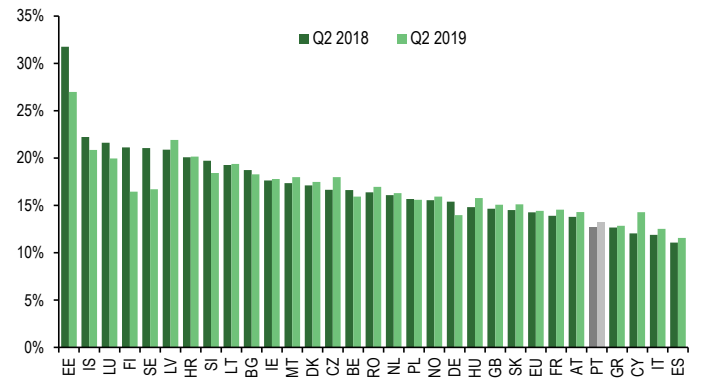


Chart 12 Source: BAE, BNP Paribas

None of the Portuguese banks made it on the list of Global Systemically Important Banks (G-SIBs) established by the Financial Stability Board (FSB). Consequently, they are not subject to additional regulatory requirements.

Risk-weighted assets decline faster than equity

The process of cleaning up the balance sheets of Portuguese banks and to a lesser extent the introduction of IFRS 9 on 1 January 2018 hampered the improvement in capital adequacy ratios. The outstanding amount of CET1 of the major Portuguese banks rose by 105% between 2007 and 2012, from EUR 13 billion to EUR 27 billion, before contracting by 24% to EUR 21 billion in 2018. Capital adequacy ratios continued to improve in the recent period because risk-weighted assets declined faster than equity capital. Risk-weighted assets declined by 31% between 2012 and 2018, from EUR 226 billion to EUR 157 billion²⁹.

For the major Portuguese banks, a lasting return to profitability would boost improvements in capital adequacy ratios, this time through an increase in equity. The major Portuguese banks have also strengthened their loss absorbing capacity thanks to issues of subordinated debt eligible as Tier 2 capital. In 2018, for example, Novo Banco and Caixa Geral de Depósitos issued EUR 400 million and EUR 500 million, respectively, in Tier 2 capital. Additional requirements for Total Loss Absorbing Capacity (TLAC) and the Minimum Requirement for Own Funds and Eligible Liabilities (MREL) should continue to support debt securities issues eligible as Tier 2 capital.

DTA eligible for a special tax regime represent additional loss absorbing capacity equivalent to 15% of CET1

Like in the Spanish and Italian banking systems, deferred tax assets (DTA) comprise a major part of the regulatory capital of the Portuguese banking system according to European Commission calculations³⁰.

²⁸ Humblot, T., 2018, *The project to remove non-performing loans from the European banking system*, Eco Flash, BNP Paribas

²⁹ Without more recent data, we were unable to make acceptable estimates for 2019.

³⁰ See European Commission, *Coping with the international financial crisis at the national level in a European context – Impact and financial sector policy response in 2008-2015*, Commission staff working document, November 2017

After the introduction of the Capital Requirements Regulation (CRR)³¹ in 2013, banks were required, as of 1 January 2018, to deduct all of their deferred tax assets that rely on future profitability, and some of those that did not, from their regulatory capital. At 31 December 2018, DTA eligible as equity capital comprised roughly 4% of CET1 outstanding amount for the major Portuguese banks, after peaking at 9% in 2016, which reflects the losses reported during this period. On average, DTA eligible as equity capital accounted for less than 10% of all the DTA of the major Portuguese banks between 2014 and 2018.

Since 2014, Portugal's tax code stipulates that under certain conditions part of bank DTAs can be converted into a tax credit to cover losses³². Since the latter is payable by the Treasury, it can be used to preserve capital adequacy ratios. In return for the conversion of DTA into tax credits, a special reserve is created with an amount equivalent to 110% of the converted DTAs, and securities convertible into ordinary shares are issued for the same amount to the Portuguese state. Based on data published by the major Portuguese banks, about 50% of their deferred tax assets were eligible for this special regime in 2018. This increased their loss absorbing capacity by about EUR 3 billion, or nearly 15% of CET1 in 2018.

In 2016, for example, Novo Banco converted deferred tax assets into a tax credit for a definitive amount of EUR 154 million after the bank reported a loss in 2015. In return, a special reserve was created amounting to EUR 169 million, i.e. the amount of DTA converted into a tax credit plus 10%³³. Similar operations were conducted for an end tax credit of EUR 99 million in 2017 and an estimated EUR 152 million in 2018, pending validation by the tax authorities in 2019. All in all, through the conversion of DTA into tax credits, the Portuguese government will hold convertible debt amounting to 6.5% of Novo Banco's equity capital at 31 December 2018 (the tax credit is postponed by a year from the year under consideration) and 10.3% according to the H1 2019 financial statement. To a certain extent, the special tax regime applied to the DTA of Portuguese banks shelters their capital adequacy ratios from any book losses.

Risks associated with "low for long" interest rates

Although lower interest rates seem to have had a rather positive impact so far on the major Portuguese banks, the levelling off of interest rates at low levels for a prolonged period, also known as "low for long", is likely to be less favourable for them in the future.

The continuation of an accommodating monetary policy combined with greater competitive pressures, notably from entities in other sectors with more flexible prudential regulations, should continue to exert downward pressure on lending rates. Yet rates are likely to fall at a slower pace as they converge on the zero lower bound. In Portugal, where lower rates have not yet stimulate growth in loan outstanding amounts, the Bank of Portugal's recommendations are likely to curb the growth of loans to

households. All things being equal, "low for long" rates should also support bank lending to NFC, but the upcoming slowdown in growth is likely to hamper demand. Under these conditions, interest income is likely to decline for the major Portuguese banks.

With interest rates already at such low levels, it seems reasonable to assume that most of the decline in bank funding costs has already occurred. The ban on applying negative rates to customer deposits serves as a floor for the funding costs of Portuguese banks. Moreover, as long as the opportunity cost for households to hold sight deposits remains so low, the structure of liabilities for the major Portuguese banks is likely to remain relatively akin. As a result, interest expense should continue to decline very moderately.

"Low for long" interest rates could end up reversing recent trends: interest income might begin to fall more rapidly than interest expense. This would squeeze the net interest margin while the positive volume effect necessary to offset its erosion would become hypothetical at best. Lastly, the outlook for operating income growth for the major Portuguese banks continues to be hampered by GDP growth forecasts (1.9% in 2019 and 1.4% in 2020 according to our scenario, compared to 3.5% in 2017 and 2.4% in 2018). Without sufficient new sources of growth, the major Portuguese banks will have little choice but to pursue their cost-cutting strategies.

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³¹ EU regulation n° 575/2013 of the European Parliament and Council of 26 June 2013

³² Law no. 61/2014 of 26 August 2014 and law no. 23/2016 of 19 August 2016

³³ Novo Banco, 2018, *Consolidated Financial Statement*



Sustainable and inclusive growth: the role of cities

William De Vijlder with the contribution of Zoé Klein

Cities today concentrate more than half of the world population and more than 80% of global GDP. The underlying dynamics explaining their ever increasing importance are the result of a variety of positive externalities (thicker labor markets, knowledge spillovers, input sharing...) generating self-reinforcing effects. These rapid waves of urbanization have key implications for the production of goods and services, environmental quality and human development. The world is one of density spikes and disparities, driven by the unstoppable ascendance of metropolises. Greener and more inclusive cities should be promoted in order for them to remain livable. In this respect, public policies have an important role to play.

By 2050, more than two thirds of the world population will be living in cities. Yet, in OECD countries, these metropolitan areas cover only 4% of land (OECD, 2015). Extreme geographical concentration is raising questions regarding the form that these new megacities should adopt to remain livable environments. Over-crowdedness, pollution and high costs are amongst the main downsides associated with life in the city. Climate change has had profound effects on urban areas with rising health risks and increasingly extreme temperatures.

From the death of distance to industrial decline, cities have faced a multiplicity of challenges and many have pondered whether this form of spatial organization would subsist. The rise of globalization and of the New Economy have revived cities' potential and propelled them to the forefront of the international economic scene. Self-reinforcing waves of urbanization are still ongoing today, mainly the result of positive externalities unique to cities.

With more efficient, more innovative and greener infrastructures, cities remain *the place to be*, so much that new rifts are forming between urban spaces and other territories. Not only have disparities intensified between successful metropolises and lagging places, but within cities as well. Urban areas' exceptional strengths have proven impressive, but the associated benefits have been largely concentrated. It is essential that their organization be rethought in order to alleviate the risk of a rising territorial divide. Public policies have a double aim of stimulating urban strengths while at the same time minimizing the resulting imbalances.

The focus should be put on adopting the right policies. Applying a standard model to city planning is a futile endeavor. Cities' inimitable strengths must be stimulated to the end of a more sustainable and inclusive development. Time has come to encourage a transition towards greener, more accessible and more affordable metropolises.

Analyzing and understanding cities

As cities are spikes in the spatial distribution of individuals, economic activity, innovation, emissions and many more, they are, by definition, unequal. Yet, the process of urbanization is only gaining momentum, exacerbating associated regional disparities. Understanding the

mechanisms underlying the formation and organization of cities is essential to grasp and tackle the resulting challenges.

Cities as trade-offs

Economies of scale and diseconomies inherent to cities coexist and entrench their existence. Krugman (1991), in his theory of New Economic Geography (NEG), sets forth the existence of co-occurring forces of agglomeration and dispersion. These provide the basis for the existence of core-periphery patterns in the distribution of economic activities. Core areas benefit from agglomeration forces and form into large cities. Dispersion forces limit city size and yield alternative places to cities, peripheries.

Agglomeration is first and foremost a concern for firms and is mainly analyzed through the prism of economic activity and production. Such advantages eventually pass onto workers and consumers who benefit from higher wages, increased employment opportunities, as well as greater choice due to product variety on the market. In 1920, Marshall outlined the three key drivers for co-location amongst firms, which are still relevant a century forward:

- Labor pooling: high labor market density allows for better matching efficiency between workers and firms;
- Knowledge spillovers: unintended positive externalities from scientific/technical discoveries stimulate the productivity of neighboring firms;
- Input sharing: the co-location of similar firms allows them to split the costs associated with intermediate goods and spurs the co-location of specialized firms producing these inputs.

To feature all three criteria necessitates a clustered organization of space, which cities provide. Urbanization takes place primarily to exploit the positive externalities associated with geographical proximity.

These externalities can be classified into two types that are simultaneously drivers and consequences of city size. Marshallian externalities, also known as localization economies, are characterized by a phenomenon of specialization within a given spatial area. The co-location of firms pertaining to one specific industry allows for knowledge spillovers among similar enterprises, resulting in an overall productivity increase. Jacobsian externalities, also called urbanization economies,



imply benefits from a process of diversification. The heterogeneity in industries present in the city allows firms at early stages of development to find their optimal production model and to benefit from solid and diversified infrastructure foundations. These two types of externalities require different levels of clustering and thus have different implications for city size. As figure 1 demonstrates, localization economies are features of smaller cities as they rely on less concentration amongst firms and workers. Urbanization economies, because of the diversity of local actors engaged in the process, are characteristics of much larger cities. As these dynamics are self-reinforcing, the presence of one or the other anchors city size.

Marshallian and Jacobsian externalities and city size

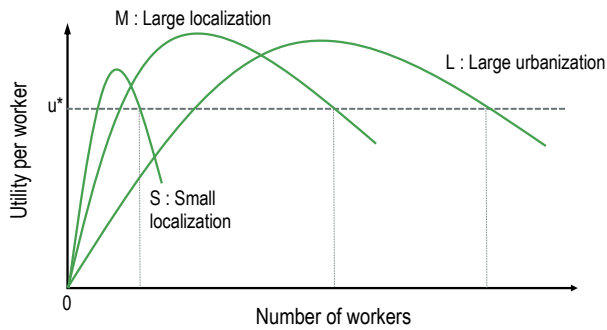


Figure 1 Source: O'Sullivan, 1990

The inverse-U-shaped conceptualization of utility in cities (cf. figure 1) is the result of existing tensions between the positive externalities laid out above and the negative externalities that originate from urban formations. While the clustering of activity provides numerous advantages for both firms and workers, there are associated costs, known as dispersion forces in Krugman's NEG theory.

As cities expand, a variety of disamenities arise. Pollution, congestion, increased competition, greater littering and noise are amongst the main negative externalities found in cities. Regarding inequalities, exclusion by costs of housing and amenities is amplified as cities grow and become increasingly dynamic. Put forward by Alonso (1964), Mills (1967) and Muth (1969), the rent gradient theory models cities as functions of rent, commuting costs and wage. This relies on strong assumptions such as fixed utility and income across the city, a monocentric model, and the exclusive location of jobs in the Central Business District (CBD).

The model has key implications for the organization of cities as it predicts a decreasing rent gradient from the CBD to city edge compensated by increasing commuting costs as one moves further from the city center. An increase in city population leads to an increase in living costs as the rent gradient shifts out (cf. figure 2). City growth is thus, by nature, an exclusionary process.

The rent gradient

Alonso-Muth-Mills model

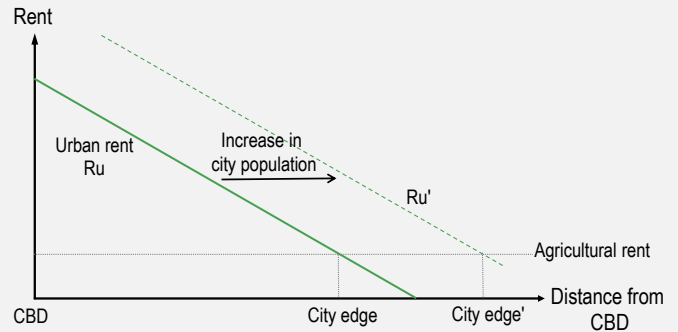


Figure 2 Source: O'Sullivan, 1990

Fixed utility: $V(z, h)$
 Budget constraint: $w(1 - tx) = z + Ph$
 $\Rightarrow z = w - wtx - Ph$
 $\Rightarrow \Delta Ph + wt\Delta x = 0$
 $\Rightarrow \Delta Ph = -wt\Delta x$

with z a numeraire good (fixed), w city wage (fixed), t transport costs (fixed), x distance from city center, P rent and h housing units (fixed)

The slope of the rent gradient is $\frac{\Delta P}{\Delta x} = \frac{-wt}{h}$, which implies that longer commutes are capitalized into housing prices

If there is an increase in population (N), it raises the rent gradient everywhere and increases city size.

Source: O'Sullivan, 1990

Monocentricism, polycentricism and urban sprawl

While the monocentric city model has a great explanatory power, its applications to real life seem limited by the rise of polycentricism. In today's cities, there often exist multiple CBDs each attracting a distinct labor pool, based on location considerations. Such an organization of the city has been increasingly promoted in order to diversify centers of job and value creation.

French policies, with the aim of promoting a more polycentric and decentralized distribution of economic activity, have sometimes had the unintended effect of promoting urban sprawl and thus of reinforcing monocentricism. There is convincing evidence of such processes in the Paris-Ile-de-France region. Policies of *villes nouvelles* (new cities) starting in the 1960s had for main objective to limit urban concentration in large cities and hamper the expansion of already-metropolitan areas. Nine new cities were introduced, amongst which five were located within a 15-50 kilometer radius from Paris. While the policy aimed at giving autonomy to these new structures, it seems that, in practice, these cities have been overwhelmed by the spreading Parisian

agglomeration and absorbed part of its excess growth. Halbert (2006) argues that this policy did not serve to slow down the rise in Paris' dominance. Quite the opposite took place as the *villes nouvelles* reinforced the monocentric nature of the Parisian agglomeration and were analogous to a phenomenon of urban sprawl at a very large scale.

Urban sprawl is a defining challenge for contemporary cities. As core metropolitan areas become too crowded, city expansion takes place further from the center into the suburbs and lower density areas. Lack of transport infrastructure, as well as distance from core areas concentrating jobs, economic activity and public services, are among the main concerns associated to urban sprawl. Inefficiencies arise from foregoing optimal city size, beyond which urban diseconomies outweigh the benefits. These processes are highly damaging, notably for environmental, efficiency and equity concerns.

Islands of innovative dynamism

Agglomeration economies featured in cities imply a disproportionate localization of activity in metropolitan areas. Perroux's (1981) work on growth poles has led him to the notable conclusion that "growth does not take place everywhere at once". Such a disparate distribution of economic dynamism is exacerbated as societies progressively enter the New Economy era. Increased use and reliance on new technologies as well as a shift towards a more service-based economy have led to the revival of cities. Geographical proximity, allowing for face-to-face contact, provides basis for the production and exchange of highly technical types of knowledge.

Cities as clusters

Clusters are defined as "a strong collection of related companies located in relatively small spatial areas" (Beaudry and Breschi, 2000). They benefit from localization economies within very specific sectors. The main underlying driver of a cluster is knowledge exchange and creation, which geographical proximity allows for. There are two main categories of knowledge: codified and tacit. Codified knowledge has a high cost of production, but a relatively low cost of transmission. It can easily be shared, no matter the distance between the two firms. On the other hand, tacit knowledge has a high cost of production and a high marginal cost of transmission. Sharing it necessitates face-to-face contact (Storper and Venables, 2004). While it has been widely argued that information and communication technologies (ICTs) would imply the *death of distance* (Cairncross, 1997), this dichotomy in knowledge types serves to explain the resilience of cities. As the production and exchange of tacit knowledge requires spatial proximity, it is a key driver of the existence of clusters and of their ever growing importance.

A cluster must feature specific characteristics in order to exist. Places should possess basic human and physical infrastructure, necessary to the production of ideas. This includes capital, technology and human resources. On the basis of these foundations should form a network of suppliers, featuring companies, specialized input providers, research labs and universities. This promotes public-private partnerships, and most specifically university-industry linkages whereby universities

produce fundamental research while labs and companies develop associated market applications. A functioning cluster should ultimately host leading firms with innovation and exporting capacities.

The spatial organization of cities as well as the agglomeration economies from which they benefit allows them to host clusters. Large metropolitan areas, benefiting from urbanization economies, act as incubators for the development of new products (Chinitz, 1961). As a result, urban areas have been the main, if not exclusive, targets of innovation policies in France. Starting in 2004, a competitive poles policy was initiated to promote the formation of clusters through the implantation of specialized research labs near firms and the distribution of subsidies for research and development (R&D). The goal of such policies was to discretionarily promote the natural features of clusters by incentivizing the co-location of fundamental and applied market research production. While the policy has had positive effects regarding innovativeness in targeted places, it has been at the heart of criticism. This top-down initiative spurred excessive specialization within clusters, with implications for places' adaptability to external shocks. According to a study by the CEPREMAP, a policy limiting the obstacles hampering the formation of clusters could have proven more efficient than one arbitrarily promoting their development (Duranton et al., 2008). The discretionary ranking of space is the implicit consequence of the theory of growth poles, which predicts that development will eventually spread to neighboring areas. Considering the still-uneven spatial distribution of economic and innovative activities in France, the theory's applicability can be put into question. It rather seems that competitive poles have had the effect of creating a hierarchy within space, characterized by Garnier (1989) as the opposition between superstar cities and the rest of France.

Local determinants of innovation

A study by the French National Institute of Statistics and Economics Studies (INSEE) finds the determinants of innovation at the regional level to be size, partnerships, public financial support, a skilled labor force, geographical proximity, and the scope of the market (Buisson, 2012). Both internal capacity and external connectivity define the innovative potential of a location. Phenomena of *cathedrals in the desert*, a term coined by Lipietz in 1980 to designate isolated poles lacking external linkages, highlight the need for locations to not only focus on their internal features. However, on the other hand, a study by Delaplace in 2012 on French high-speed trains (TGV) goes to show that external connectivity cannot improve a location's attractiveness on its own either. New rail connections for small and medium cities have limited effects compared to larger cities. This results from usage potential, which is much higher in already-attractive places. Therefore, while external connectivity must not be overlooked, it should not be considered a means-to-an-end either in terms of attractiveness promotion.

The case of the rehabilitation of a train station in Saint-Omer (France) goes to show the complementary nature between external linkages and internal innovativeness. The disused train station of Saint-Omer is to be put back into use as a way to promote the location's attractiveness. Complementarily, this initiative projects to transform the train station into



a place of work and innovation. To do so, the station will feature 3,000 square meters of collaborative space, a Fab Lab offering free training on digital tools and robotics as well as a business incubator, and a museum on digitalization. The “Station” project illustrates the possibilities cities can benefit from in the development of pools of innovativeness. Saint-Omer already possesses infrastructure foundations and features a small agglomeration of people, with 56 trains passing by every day and more than 800,000 annual commuters (Allix, 2019). Local amenities and local actors should be rooted in development so as for initiatives to truly be location-appropriate.

The polarization of space

Natural processes of agglomeration paired with public policies promoting clustering have induced an intense polarization of space. Processes of desertification across regions, to the benefit of cities, have exacerbated regional disparities in terms of production, innovation and employment. Skills have agglomerated within cities, attracted by the multiplicity of opportunities, dedicated infrastructures and co-location of innovative workers. The information economy has favored places with a high concentration of higher-education graduates, to the ultimate benefit of large metropolitan areas (Davezies and Pech, 2014). The process of skill-biased technical change has thus instituted a polarized labor market within urban areas, with eventual repercussions on regional disparities. While new technologies are substitutes for semi-skilled labor, low- and high-skilled employments are harder to automate. As the opportunity cost of high-skilled workers increases due to higher wages, household activities such as cleaning, maintenance, etc. are outsourced to low-skilled workers. Wages at the bottom of the distribution are thus increasingly linked to those at the top. This drives wage differentials upwards all along the income distribution in cities, exacerbating imbalances relative to non-urban areas.

While the classical rural-urban opposition has put great focus on regional disparities, issues of within-city inequalities are increasingly becoming a concern. With two thirds of the households below the poverty line living in urbanized areas (Aerts et al., 2015), French cities have seen the emergence of sharp inequalities. The clear-cut difference between low- and high-skilled workers has led to “sorting effects” as evidenced by Berkes and Gaetani (2019). High skilled-individuals co-locate near their work, which drives the costs of amenities up within these specific areas of the city. As a result, a process of income segregation takes place whereby high-skilled individuals further co-locate together and lower-skilled individuals are excluded from particular neighborhoods. Amplification effects relative to knowledge spillovers further reinforce the benefits enjoyed by the better-off parts of the city. Berkes and Gaetani (2019) find that approximately 20% of the rise in income segregation in US cities can be attributed to the rise of innovation. Heightened mobility in cities has also served to exacerbate social segregation across neighborhoods of metropolitan areas. Modest households are constrained to live at city edges where rents tend to be lower (cf. figure 2). Inclusionary zoning should be increasingly promoted to tackle such a disparate organization of space.

Greening cities

Cities’ share of the burden

Cities are amongst the main culprits when it comes to climate change. While urbanization is extremely restricted in terms of global terrestrial surface covered (~4%), cities still manage to consume 80% of global energy and account for 80% of GHG emissions (World Bank, 2010). Phenomena of urban heat islands (UHI) are amongst the main illustrations of the impact of climate change on cities. Temperatures in cities tend to be higher than that in rural areas, with an extra 3.5 to 4.5°C, reaching up to a 10°C difference in larger cities (OECD, 2010). These imbalances in temperature levels across urban and rural spaces are consequences of reduced areas covered by vegetation and water in cities as well as the heat-trapping effects of high-rise buildings and asphalt roads. Unprecedented spikes in temperatures in the summer of 2019 in France, reaching a record level of 43°C in Paris, are materializations of the UHI effect. Warmer temperatures increase the concentration of air pollutants and exacerbate environmental damage and health risks. Furthermore, vicious effects are associated with UHI for city energy consumption, as warmer temperatures notably lead to a greater use of air conditioning. Energy, building and transport inefficiencies are key areas that must be targeted in order to make urban development more sustainable. Specific city planning decisions can also be taken to promote less polluting forms of urbanization. Cities have both the tools and the capacities to be leaders in the fight against climate change.

Room for maneuver

Cities have more leeway to become green poles and drivers of the ecological transition. As important polluters, a marginal decrease in their emission levels would have large effects on the overall environmental balance of a country. Cities consume 80% of the global energy production (World Bank, 2010); making energy use more efficient is a key lever to make cities more sustainable. Commercial and residential buildings, transport networks, waste management as well as public lighting are amongst the most voracious urban energy consumers. To tackle such issues, cities benefit from economies of scale. Doubling the population of any city requires an approximate 85% increase in physical infrastructure (electrical cables, water pipes, road surface...) according to a study by Bettencourt et al. in 2007. Larger and more developed cities can thus resort to proportionately smaller stocks of infrastructure and reduced energy use. Specific policies and city planning efforts are needed to exploit such economies of scale.

Regarding the building stock, there are many ways to go about to make it increasingly environmentally-friendly. Promoting shallower building forms for natural ventilation and daylight penetration can allow for a clear reduction in air conditioning and artificial lighting uses. Optimizing glazing ratios can also have consequences for the minimization of energy demand. Studies show that in moderate climates, the window to



wall ratio should be of about 20%, whereas in hotter climates it is recommended to be of 10% (Alwetaishi, 2017). Ratios tend to be quite low as larger windows can cause inefficient energy loss and excess heat due to sunlight exposure.

Building renovation is a requirement for any eco-city. In France, the government is aiming for its 35 million dwellings to be labeled *Low Consumption Buildings* (Bâtiment Basse Consommation). With 7.5 million dwellings graded F or G today (the lowest grades on the energy performance scale), there is still a long way to go for the French building stock to become sustainable. The energy and climate law of 2019¹ has introduced an obligation for households to carry out improvement works, in order for all dwellings to reach at least category E on the energy performance scale by 2028. While the building stock is a key lever for the ecological transition, the timespan given to undertake the works as well as the envisioned sanctions for not respecting this obligation seem weak relative to the potential gains. These ambitions still transpire the increasingly central role that building efficiency plays in the fight against climate change. Urban areas' building stocks are disproportionate compared to suburban and rural areas', and detached housing tends to be more polluting than residential buildings. In addition, a study by Maury and Gilbert (2015) has revealed the existence of strong territorial inequalities in terms of energy poverty² and energy vulnerability³, which touches 22% of the French population. As territories are located further from urban poles, the risk of energy vulnerability increases, reaching a maximum of 9.5% in rural areas fully isolated from all urban influence, 3.5 times higher than the national average (Davezies and Rech, 2014). Building sustainable dwellings requires locating them where they will do the least ecological harm. Home to more efficient dwellings, cities have the potential to act as leaders for a greener way of life.

Another key infrastructure on the path toward greener cities is transportation. Considering cities' range of choices in terms of transport options compared to suburban and rural areas, they possess much greater leeway to promote sustainable mobility. Private vehicles consume twice the energy per passenger per kilometer of a train and almost four times that of a bus (Steeemers, 2003). Greater incentives for public transportation use at the expense of private vehicles thus have great implications for overall energy consumption and emissions. Making transport networks more efficient in terms of connectivity, speed and costs to incentivize city residents to favor shared rides to private ones is in the hands of cities. In the absence of such an efficient public transport system, increasing city population and city size will only increase traffic and pollution. This constitutes one of the main challenges associated with urban sprawl. In 2018 in the Paris agglomeration, daily commutes by car reached 0.4 million within the city center, 3.3 million within the inner suburbs and 8.5 million within the outer suburbs (OMNIL, 2019). In the case of the Aix-Marseille metropole, approximately 77% of the population living in suburban

areas outside of Marseille has no access to public transports, 14% has limited access and only 2% has high access (Poelman and Dijkstra, 2014). There is a clear urgency to make public transportation more inclusive and efficient to face the realities of sprawling cities. Making cities denser and more connected can lead to a stronger reliance on public transports, and to shorter and faster commutes (OECD, 2012). Greater accessibility has clear benefits not only for sustainability, but for the promotion of agglomeration economies and the mitigation of inequalities too. Bringing individuals closer together intensifies the positive dynamism that cities benefit from while reducing their energy consumption bill.

Compact cities

Numerous distinct initiatives exist as part of the overarching goal of making cities less energy-voracious. City planning allows for the operation of these different levers as one. Traditional city planning has spurred urban sprawl, which has proven to be largely incompatible with more productive, more innovative and more sustainable forms of urbanization. Reversing such trends necessitates the promotion of a denser way of life. Compact cities have recently emerged as the archetype of the sustainable city. They feature high residential density, mixed land use as well as better accessibility by public transport. A compact city does not necessarily mean a small city: this type of development promotes higher density rather than a more dispersed development as a response to increasing population levels. A compact city does not imply a monocentric model either: polycentricism and compact planning are largely compatible for as long as the distinct centers are effectively linked together by efficient modes of public transportation.

Mixed land-use implies the co-location of residential and commercial activities with green spaces and offices. Such a combination allows for mixed energy demand, which tends to avoid spikes in consumption within the city and to preserve urban open spaces. Better access to amenities promotes face-to-face contact between individuals and limits residential segregation relative to income or work activity. More efficient and developed transport networks, as well as limited amenities for the use of private vehicles incentivize heavier reliance on shared transportation modes. Empirical evidence has further demonstrated that central cities that limit traffic tend to be economically better-off than those with generous parking (Kenworthy, 2006), the main explanation being the attenuation of issues relative to pollution and congestion.

Compact city planning exploits the economies of scale from which urban areas can benefit as the construction and maintenance of infrastructures, such as water supply, drainage, roads, buildings and public transport, use less energy than in a more dispersed setting. By limiting urban sprawl, the compact city also limits soil erosion and losses in biodiversity. Denser cities preserve green spaces within and outside urban areas, restricting the transformation of agricultural areas into new components of the city. In the case of the Ile-de-France region, the Schéma Directeur de la Région Ile-de-France (SDRIF) has adopted a compact logic. Urban development is incentivized to favor places already served by public transportation to further reinforce existing density and connectivity. The scheme also requires municipalities to set

¹ Loi du 8 novembre 2019 relative à l'énergie et au climat

² Loi du 12 juillet 2010. Energy poverty: "situation in which an individual struggles to acquire the necessary energy supply to meet basic needs, due to inadequate resources or housing conditions"

³ Ducharme and Van Lu, 2019. Energy vulnerability: "situation in which a household spends at least 8.2% of its disposable income on energy expenses for its dwelling, corresponding to twice the metropolitan median"



density targets. The goal is to limit the expansion of built infrastructures onto the region's preserved open spaces.

Compact cities, while extremely attractive in theory, have faced challenges in practice. Accessibility and livability concerns are amongst the most prominent issues. Regarding accessibility, the rent gradient theory (cf. figure 2) predicts that higher density and higher population levels will yield higher rents in all parts of the city. Inclusivity is challenged as fewer individuals can access urban areas and their amenities. In terms of livability, strong proximity reduces privacy as well as the availability of open and green spaces. These issues constitute the compact city paradox, which lays out that to be sustainable cities must be highly dense, but that to be livable, cities should be more dispersed. Once again, cities are trade-offs from which result their optimal size and density levels. In order to reach this equilibrium, however, it is essential to limit urban inefficiencies. Better connectivity, more efficient land-use and lower energy consumption make up cities' improvement potential. Cities can be leaders in the energy and ecological transitions, and it is at their scale that efforts should be maximized.

Smart cities

In the continuation of the compact city model, smart cities have emerged as modern and connected forms of urbanization. They rely on the use of ICTs in order to ameliorate the quality and efficiency of urban services at a limited cost. Centralized collection of data is used to improve and tailor urban services to local needs in real time. Multiple initiatives have blossomed around the world. The case of Issy-les-Moulineaux in France is of great interest considering the fast digitalization of the city. Issy-les-Moulineaux first adopted a compact city model with a mixed use of land for housing, commercial areas, green spaces and offices. As a way to further limit congestion and pollution, underground connected systems of waste management have been put in place in order to replace garbage trucks. Energy management has been centralized and the use of new technologies has allowed for a smarter distribution of electricity across the city. This avoids spikes in consumption as energy production is tailored to energy needs in real time. Captors have been installed throughout the city for street lighting to instantaneously modulate supply based on the presence of vehicles and pedestrians, and for available parking spots to be catalogued and booked ahead on a mobile phone application⁴.

Cities are the perfect locations for the development of such solutions thanks to strong innovative capacities and economies of scale in infrastructure production. In the case of the Paris-IDF region, Cap Digital and Advancity⁵ have joined forces to become a key actor on the European stage for the development of the city of the future. With more than 800 start-ups and small and medium enterprises, 70 research labs, schools and universities, and the involvement of 8 local governments, the cluster promotes R&D for more sustainable, inclusive and livable cities.

⁴ <https://somobility.fr>

⁵ <https://advancity.capdigital.com/>

Lagging areas as collateral damage of urbanization

While processes of urbanization have been extremely beneficial in a multiplicity of sectors and for a great number of individuals, issues of within-city inequalities and regional disparities nuance this picture. Metropolitan areas' forces of attraction have resulted in a strong concentration of production, innovativeness, employment and human resources, but also of public services, proximity equipments and digital access infrastructures. This form of territorial organization has spurred a rift between urban spaces and others. In this respect, the OECD has recently insisted on the need for efficient public policies to "make cities work for all" (OECD, 2016).

Geography of discontent

Social movements in several cities around the world are evidence of the new geography of discontent. Coined by McCann in 2016, this term refers to the geographical breakdown whereby multiple places that have faced stagnating or even declining growth hold resentment towards successful locations that have flourished. While manifestations of this discontentment have strong economic roots, they are also deeply driven by growing territorial divides.

In France, the Institute for Public Policies has analyzed the social movement's patterns with regards to territorial variables (accessibility, mobility, average distance between home and work). Their results show that issues of accessibility are strongly correlated to mobilizations, both online and in-person (Boyer et al., 2019). This further conveys of the mobility-hampering nature of commuting times.

Phenomena of spatial mismatches between home and work reinforce concerns of accessibility and income segregation. Employment is highly concentrated in cities, and even more within specific neighborhoods. While Paris counts 1.76 filled jobs per worker, this number drops to 0.97 in the inner suburbs of the city and to 0.75 in the outer suburbs (Gobillon and Selod, 2004). Distance from the CBD is negatively correlated with available information on vacancies (Rogers, 1997) and positively correlated with costs of job search (Ortega, 2000), which serves to explain weaker access to the labor market as one moves further out. This is amplified by insufficient connections of suburban and rural areas to the city center by public transportation as well as the difficulties for individuals with weaker incomes to afford a car (Gobillon and Selod, 2004).

Helping forgotten territories

As one moves out of cities, rich places tend to rarify and poorer areas become more numerous (Maurey and de Nicolay, 2017). While it had long been considered that urban wealth and development would 'trickle down' to the rest of the territory, it has now been widely observed that regional disparities have persisted and have even intensified with globalization and the rise of ICTs. Improving accessibility to successful places and stimulating local endogenous development are instrumental in integrating forgotten territories in the general process of growth.



Providing these territories with the necessary linkages to have access to cities will improve their physical mobility, with direct repercussions on social mobility. This has implications for the management of rail transport networks as location can ultimately become a burden. Territorial determinism should be addressed by public policies. Further to physical mobility, isolated places must also enjoy their own amenities in order to be successful, livable and increasingly self-sufficient. Several initiatives have been instituted by the French government, but in a number of areas little progress has been made.

France's High Speed Plan (Plan France Très Haut Débit), initiated in 2013, has been deemed crucial to tackle the growing digital divide: it aims at providing very high speed coverage to the entire country by 2022. Access to an internet connection and to mobile networks remains very porous in France, with the coexistence of white zones and highly connected places. Indeed, less dense areas benefit from a much weaker connection than do large cities (Monchatre, 2019). To reach its objectives by 2022, France's High Speed Plan must however double hirings (Banque des Territoires, 2019). As administrative procedures are increasingly being digitalized as part of the Public Action 2022 scheme⁶, access to an internet connection is increasingly becoming a discriminatory factor feeding territorial disparities.

To a wider extent, overall access to public services has been highly uneven across different types of locations. Cities' high density provides scale economies for the implementation of public services and their dwellers can thus benefit from easy access to such amenities. In small and medium cities the situation can be very different. For tackling these issues, the financial means of local authorities play a key role. Rodríguez-Pose and Ezcurra (2009) note that, in developed countries, fiscal decentralization has very promising implications for economic convergence. Public actions at the local scale allow public spending to better match the disparate needs of territories compared to top-down approaches.

More recent French policies are increasingly promoting bottom-up approaches and offering tailored support to local actors. As part of the Innovation Territories policy (Territoires d'Innovation), the Biovallée project in Auvergne-Rhône-Alpes promotes transition solutions for rural areas. Developing local energy production, organic farming and training programs matching local needs in skills are amongst the main propositions made to innovate outside of city-clusters.

Reframing cities' potential

The development of cities has spurred significant divergences between urbanized places and their neighbors. In addressing these, in France, an extensive focus has been put on successful places in hope that spillovers would flow onto surrounding populations, and top-down *one size fits all* policies have promoted a centralized approach to specific regional issues. Cities should continue to be promoted, but in redefining their potential, they can be turned into drivers of sustainability and inclusiveness.

⁶ Action publique 2022: target of making 100% of administrative procedures accessible online by 2022, including on smartphones

Cities as drivers of sustainability and inclusiveness

Large cities have the potential to become leaders of the ecological transition. Similarly, cities can review their functioning so as to contribute to the reduction of territorial inequalities. Urbanization can become a beneficial process for individuals in general, irrespective of their location. Accessibility concerns have been widely addressed and are essential to tackle for all dwellers to have equal access to urban amenities and opportunities. A more inclusionary zoning would enable households, irrespective of their income, to locate in cities' productive and well-connected areas. Housing policy thus emerges to be highly complementary to transport policy.

Large cities suffer from an unbalanced housing market, where supply is diluting and demand is high on a sustained basis (APUR, 2007b). The situation is even more complex for modest households. In metropolises, demand for social housing is remarkably higher than in other types of places; for six demands there is, on average, only one attribution of a social dwelling (APUR, 2007b). In the case of the Paris-IDF region, 6% of the municipalities, mainly located outside the city center, gather half of the regional stock of social housing (APUR, 2007a). Low-income individuals living in such types of housing are thus pooled together in segregated parts of the metropolis. This has strong implications for inequalities due to a combination of low mobility and alienation from pools of employment located in the city center (Guilluy, 2014). Social housing policy can thus have the unintended effect of further alienating individuals due to excessive spatial concentration.

Tackling issues of low supply and of spatial concentration would make the city more inclusive and more accessible to low-income households. This would promote stronger social diversity within large cities and address issues of urban expansion. According to APUR (2007a), in building inclusive and sustainable social housing, city planners should resort to vacant housing and urban renewal. Higher density implies better access to labor pools for low-income individuals. The compact city model can thus enhance cities' inclusivity as well as their sustainability if social dwellings are fully integrated to mixed land use planning efforts.

Providing access to larger cities to different income groups through transport and housing policies is a key factor in providing equal access to opportunities. Further to hosting more jobs and more public services, metropolitan areas have clear benefits for upward social mobility and well-being. The density in social and educational supply as well as in job opportunities acts like social insurance for workers (Guilluy, 2014).

The future of development policies

Public policies should combine place-based and people-based approaches, in order to tap into lagging areas' potential (Rodríguez-Pose, 2018) as well as give individuals the possibilities to move towards opportunities (World Bank, 2009). Lower mobility in European countries has exacerbated territorial inequalities (Rodríguez-Pose and Lee, 2013). Reversing this would greatly enhance cities' potential as hubs of innovation, ecology and employment, while limiting resulting territorial



imbalances. This would contribute to a more inclusive growth. According to Maurey and de Nicolay (2017), achieving this goal necessitates a greater focus on the general welfare gains of public investments in infrastructures and transport networks rather than on economic profitability. Meanwhile, sustainability could become a key feature of modern cities if efforts were continued in terms of infrastructure renovation and compact and smart city planning.

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REFERENCES

- Aerts, A.-T., Chirazi, S., Cros, L. (2015), *Une pauvreté très présente dans les villes-centres des grands pôles urbains*, Insee Première, 1552
- Allix, G. (2019), *A Saint-Omer, la gare comme locomotive économique*, Le Monde, 15 novembre 2019
- Alonso, W. (1964), *Location and Land Use*, Harvard Univ. Press, Cambridge, MA
- Alwetaishi, M. (2017), *Impact of glazing to wall ratio in various climatic regions: A case study*, J. King Saud Univ. – Engineering Sci
- Atelier Parisien d'Urbanisme (APUR). (2007b), *Quels leviers pour augmenter l'offre des logements de toutes catégories, en particulier pour les ménages les plus modestes. Le logement, une ambition pour la conférence métropolitaine*, note de synthèse
- Atelier Parisien d'Urbanisme (APUR). (2007a), *Comment produire du logement accessible au centre de l'agglomération métropolitaine ? Les leviers d'action sur le prix du foncier et de l'immobilier*, Note de synthèse
- Beaudry, C., Breschi, S. (2000), *Does 'clustering' really help firms' innovative activities?* CESPRI, Working paper 111
- Bettencourt, L.M.A., Lobo, J., Helbing, D., Kuhnert, C., West, G. (2007), *Growth, innovation, scaling, and the pace of life in cities*, Proceedings of the National Academy of Sciences 104(17): 7301-7306
- Berkes, E., Gaetani, R. (2019), *Income segregation and rise of knowledge economy*, SSRN 3423136
- Boyer, P.C., Delemotte, T., Gauthier, G., Rollet, V., Schmutz, B. (2019), *Le territoire de gilets jaunes*, Note IPP n°39
- Buisson, B., Denoiseau, L., Kubrak, C., Monga, M., Autant-Bernard, C. (2012), *Les déterminants régionaux de l'innovation*, INSEE, Direction de l'Action Régionale, Document de travail E 2012/01
- Cairncross, F. (1997), *The Death of Distance*, London: Orion Business Books
- Chinitz, B. (1961), *Contrasts in Agglomeration: New York and Pittsburg*, American Economic Review, 51 (2), 279-289
- Davezies, L., Pech, T. (2014), *La nouvelle question territoriale*, Terra Nova
- Delaplace, M. (2012), TGV, *Développement local et taille des villes ; Une analyse en terme d'innovation de services*. Revue d'économie régionale urbaine, n°2, pp. 265-292
- Dijkstra, L., Poleman, H. (2014), *A harmonised definition of cities and rural areas: the new degree of urbanization*, European Commission Directorate-General for Regional and Urban Policy: Working Paper
- Ducharme, T., Van Lu, A. (2019), *Vulnérabilité énergétique dans le Grand Est*, Insee Dossier Grand Est n°10
- Duranton, G., Martin, P., Mayer, T., Mayneris, F. (2008), *Les pôles de compétitivité, que peut-on en attendre ?* CEPREMAP, conclusion p. 78-82
- Garnier, J.-P. (1989), *Les technopoles : des métropoles de déséquilibre ?*, Quaderni, 6, 91-98
- Gobillon, L., Selod, H. (2004), *Les déterminants spatiaux du chômage en Île-de-France. Ségrégation urbaine et intégration sociale*, Rapport pour le Conseil de l'Analyse Economique, Paris, La Documentation Française, 171-187
- Guilluy, C. (2014), *La France périphérique. Comment on a sacrifié les classes populaires*, Flammarion
- Halbert, L. (2006), *The polycentric city-region that never was: Paris agglomeration, Bassin parisien and spatial planning strategies in France*. Built Environment Special Issue
- Kenworthy, J.R. (2006), *The eco-city: ten key transports and planning dimensions for sustainable city development*, Environment and urbanization, 18(1), 67-85
- Krugman, P. (1991), *Increasing Returns and Economic Geography*, Journal of Political Economy, June
- Lipietz, A. (1980), *The structuration of space, the problem of land and spatial policy*, in J. Carney, R. Hudson and J. Lewis (eds) Regions in crisis, London: Croom Helm
- Mauray, H., de Nicolay, L.-J. (2017), *Aménagement du territoire : plus une nécessité que jamais*. Commission de l'aménagement du territoire et du développement durable, Sénat, Rapport d'information n°565 (2016-2017)
- Maury, S., Gilbert, A. (2015), *La vulnérabilité énergétique plus répandue dans les territoires ruraux*, Insee Analyses, n°42
- Marshall, A. (1920), *Industry and Trade*, Macmillan, London, UK



- McCann, P. (2016), *The UK regional-national economic problem. Geography, globalisation and governance*, London: Routledge.
- Mills, E. S. (1967), *An aggregate model of resource allocation in a metropolitan area*, Amer. Econ. Rev. 57, 197–210.
- Monchatre, V. (2019), *L'est du Grand Est mieux connecté que l'ouest*, Insee Analyses Grand Est, n°92
- Muth, R. F. (1969), *Cities and Housing*. Chicago: The U. of Chicago Press
- OECD (2010), *Cities and Climate Change*, OECD Publishing
- OECD (2012), *Compact City Policies: A Comparative Assessment*, OECD Green Growth Studies, OECD Publishing
- OECD (2015), *The Metropolitan Century: Understanding urbanisation and its consequences*, OECD Publishing
- OECD (2016), *Making cities work for all: Data and actions for inclusive growth*, OECD Publishing
- OMNIL (2019), *La nouvelle enquête globale transport*
- Ortega, J. (2000), *Pareto-improving immigration in an economy with equilibrium unemployment*, Economic Journal, n°110, pp. 92-112
- O'Sullivan, A. (1990), *Urban Economics*, McGraw-Hill
- Perroux, F. (1981), *Pour une philosophie du nouveau développement*, Aubier/Presses de l'Unesco, Paris, 279
- Rodríguez-Pose, A., Ezcurra, R. (2009), *Does decentralization matter for regional disparities? A cross-country analysis*, Journal of Economic Geography, 10(5), 619-644
- Rodríguez-Pose, A., Lee, N. (2013), *Innovation and spatial inequality in Europe and USA*, Journal of Economic Geography, 13(1), 1-22
- Rodríguez-Pose, A. (2018), *The revenge of the places that don't matter (and what to do about it)*, Cambridge Journal of Regions, Economy and Society, 11(1), 189-209
- Rogers, C. (1997), *Job Search and Unemployment Duration: Implications for the Spatial Mismatch Hypothesis*, Journal of Urban Economics, n°42, pp. 109-132
- Stemers, K (2003), *Energy and the city: density, buildings and transport*, Energy and buildings, 35(1), 3-14
- Storper, M., Venables, A.J. (2004), *Buzz: face-to-face contact and the urban economy*, Journal of Economic Geography, 4: 351–370
- World Bank (2009), *Reshaping Economic Geography*, World Development Report
- World Bank (2010), *Cities and Climate Change: an Urgent Agenda*, Urban Development Series, 10, 17



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