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Analysis

Beyond carbon pricing: The role of banking and monetary policy in financing the transition to a low-carbon economy

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ABSTRACT

It is widely acknowledged that introducing a price on carbon represents a crucial precondition for filling the current gap in low-carbon investment. However, as this paper argues, carbon pricing in itself may not be sufficient. This is due to the existence of market failures in the process of creation and allocation of credit that may lead commercial banks — the most important source of external finance for firms — not to respond as expected to price signals. Under certain economic conditions, banks would shy away from lending to low-carbon activities even in the presence of a carbon price. This possibility calls for the implementation of additional policies not based on prices. In particular, the paper discusses the potential role of monetary policies and macroprudential financial regulation: modifying the incentives and constraints that banks face when deciding their lending strategy — through, for instance, a differentiation of reserve requirements according to the destination of lending — may fruitfully expand credit creation directed towards low-carbon sectors. This seems to be especially feasible in emerging economies, where the central banking framework usually allows for a stronger public control on credit allocation and a wider range of monetary policy instruments than the sole interest rate.

1. Introduction

Transitioning to a low-carbon society will require a large amount of economic resources to be invested in 'green' sectors[1] (Ceres, 2014; IEA, 2012; McCollum et al., 2014; WEF, 2013). Investment is, from a macroeconomic perspective, expenditure: investing consists in purchasing investment goods and services — e.g. wind turbines — to be used in the production of some consumption good or service — electric energy.

Like any other type of expenditure, investment requires firms to have at their disposal a sufficient amount of financial means. Given the upfront costs of investments — particularly high in the case of renewable energy production — firms are typically unable to finance them through their own savings and thus necessitate access to external finance.[2] In other words, they need to borrow money from someone else *before* being able to invest.

External finance can originate, to a first approximation, from three main sources:

- *Bank lending*. Firms ask a banking institution for a loan; if the loan application is accepted, the agreed amount of credit is put at their disposal on a deposit account, which firms can then use to purchase the goods and services they need.
- *Market debt*. Larger firms or projects can raise finance on private capital markets by issuing debt instruments. The market for 'green bonds',[3] for instance, is experiencing a phase of strong expansion.
- *Market equity*. Private investors can also be interested in obtaining part of the project/firm ownership. In the case of companies, this can happen via the purchase of shares of publicly listed companies, or through private equity investment.

Among these, bank lending is particularly important, for two main reasons. First, bank loans represent the most common source of external finance for firms. Gross bank lending to British businesses in 2013, for instance, was almost three times the gross issuance of corporate bonds and more than ten times that of public equities (Bank of England, 2014). Bank of England (2013b) also shows how the dynamics

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[1] 'Green' investment indicates here investment in all productive sectors that help to improve the environmental sustainability of the economic system: production of energy from renewable sources, improvement of energy efficiency in buildings and transportation, management of natural capital, waste management, water management, sustainable agriculture, and others.

[2] For instance, BDRC Continental (2014) estimates that in Q4 of 2013 the proportion of British firms using external finance was: 74% for firms with 50–249 employees; 65% (10–49 employees); 53% (1–9 employees); 35% (0 employees).

[3] Green bonds are fixed-income instruments aimed at financing low-carbon or other environmentally sustainable activities (CBI, 2014; HSBC, 2014).

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of total net external finance has been strongly driven by changes in bank lending, both before and after the financial crisis. This is true also for the Euro Zone and the United States (ECB, 2012). Ecofys (2011) reports that the banking sector has been the principal source of debt finance for the European renewable energy sector.

Second, in modern societies banks are very special entities, capable of having a critical impact on the functioning of economic systems. There is in fact a crucial but often overlooked difference between banks and non-bank private investors: while the latter operate by reallocating the existing stock of credit, commercial banks are the only economic agents — together with central banks — capable of creating *new* credit[4] (Disyatat, 2011; McLeay et al., 2014; Ryan-Collins et al., 2011). Despite its wide repercussions on the rest of the system, the ability of banks to expand the money supply is only loosely regulated and substantially autonomous, as confirmed by the ineffectiveness of recent central banks attempts — both the traditional ones based on interest rates and the 'unconventional' ones centred around the expansion of central bank reserves — to reactivate bank credit creation (BIS/NIESR, 2013).

Among the policies put forward to try to expand the amount of bank credit flowing to low-carbon sectors, the introduction of a carbon price — either through a tax on the polluting content of goods and services or through the creation of a market of emission permits — is the one that has gathered the vaster consensus among scholars and policy-makers. Making green products relatively more convenient through prices would boost their demand, increase the profitability of firms operating in low-carbon sectors and thus facilitate the creation of credit directed to them.

However, despite being a necessary precondition to steer the economic system towards a rapid low-carbon transition, the introduction of a carbon price may not be sufficient. The autonomy of the private banking sector in creating and allocating credit is in fact at the origin of a major market failure, as, even in the presence of profitable investment opportunities and the 'right' prices, banks may not be willing to provide the amount of credit the economy requires to move closer to full capacity utilization. Under certain economic conditions, of which the current historical period is a clear example, banks are more interested in adjusting their balance sheets by constraining credit and securing safe assets rather than pursuing the highest rates of return on investments (Koo, 2014; Zenghelis, 2012). In such circumstances, the introduction of a price on carbon may not be enough to stimulate low-carbon investment.

This eventuality, jointly with the uncertainties and political difficulties surrounding the introduction of a carbon price, calls for considering additional policies targeted directly at the credit system. In particular, this paper will discuss the relevance and feasibility of using macroprudential financial regulation[5] to expand the amount of credit flowing to low-carbon activities. For instance, differentiating the reserve requirements that banks have to respect according to the 'greenness' of the activities they finance may represent a solid incentive for them to shift part of their lending towards low-carbon sectors (Banque du Liban, 2010; Rozenberg et al., 2013).

As it will be argued in Section 7, this 'green' macroprudential regulation is likely to work only at certain conditions. In particular, it has a better chance to be effective in emerging economies, where central banks usually exhibit a higher degree of control on the dynamics of credit, thanks to the employment of a wide range of 'quantitative' monetary policy tools. In high-income economies, on the contrary, the reduction of monetary instruments to the sole interest rate makes it very hard for central banks to modify private banks' lending behaviour. Nonetheless, even in these countries, the employment of quantitative monetary policies aimed at strengthening the public control on the allocation of credit — often with some specific sectors in mind — is far from unprecedented (Elliott et al., 2013).

This paper thus aims to bring the green growth and sustainable development discussion closer to the one on monetary macroeconomic dynamics. A proper understanding of the interactions between these two bodies of knowledge — traditionally separate from one another — appears to be critical for the achievement of a sustainable economy.

The structure of the paper is as follows. Section 2 presents estimates of the green investment gap and discusses the main obstacles to filling it. Section 3 explains the process of credit creation and allocation by commercial banks. Section 4 introduces the concept of credit market failure and argues for the implementation of environmental policies not based on carbon pricing. Section 5 examines the recent regulators' attempts to limit banks' autonomy through financial regulation and their effects on green investment. Section 6 reviews macroprudential policy proposals aimed at increasing credit flows to low-carbon investment. Section 7 focuses on the idea of green differentiated reserve requirement ratios, discussing the conditions under which the policy is likely to be effective. Section 8 analyses the potential role of development banking. Finally, Section 9 concludes and discusses the role of economic theory.

2. Filling the green investment gap

The transition to a sustainable economic system will require economic resources to flow to low-carbon productive sectors. Although the transition to a green economy is inherently systemic and would have to involve the entire economy, three key sectors exist: 1. production of energy from clean and renewable sources (for instance, solar panels and wind turbines); 2. improvement of energy efficiency (in buildings and transport especially); 3. conservation and smart use of natural capital (sustainable agriculture, fishing, water, waste and other sectors). The expansion of low-carbon investment will have to take place simultaneously to a rapid decline of investment in polluting and energy-intensive sectors.[6]

Investment in green sectors has been growing at a fast pace in recent years. In particular, investment in new renewable energy production capacity — for which more and better data is available — has reached approximately US$214 billion in 2013, an amount four times larger than in 2004[7] (FS-UNEP and BNEF, 2014). The expansion has been particularly robust in developing regions, with China currently the main investor in renewable energy at around US$56 billion. The scale of investment is confirmed by CPI (2014), which, with a tracking method based on a wider class of investment rather than just energy supply, estimates global 'climate finance' in 2013 to be around US$331 billion. However, investment in clean energy is currently declining. 2012 and 2013 recorded an annual drop of 7% and 9% respectively, mainly as a result of the reduction of investment in Europe and US (BNEF, 2014). Preliminary data for 2014 show an encouraging inversion of the recent trend, with investment up 16% from previous year (BNEF, 2014). This has been due to a variety of factors, among which the cutback of feed-in tariffs and other similar policies have played a particularly important role, highlighting how these forms of energy production are still very dependent on public support.

Despite the upward trend of the last decade, a large gap still exists between the current amount of green investment and what would be

[4] The terms 'credit', 'broad money', and 'money supply' are here interchangeably employed as synonyms, and indicate the widest monetary aggregate in the economy, the majority of which is made of bank deposits of various kinds. 'Credit' does not include, as sometimes happens in the literature, the much wider amount of financial assets existing in the economy.

[5] The term 'macroprudential regulation' denotes the set of financial regulatory instruments put in place to improve the stability and resilience of the financial system.

[6] According to FS-UNEP and BNEF (2014) gross investment in power capacity based on fossil fuels in 2013 was equal to US$270 billion.

[7] Data reported in FS-UNEP and BNEF (2014) cover investments in: solar, wind, biomass & waste, small hydro, biofuels, geothermal and marine. Large hydro (>50 MW) is excluded.