

### BOX 1.1 Negative Interest Rates in Europe: A Glance at Their Causes and Implications

*A number of major central banks in Europe have set key policy rates at negative levels in order to further encourage lending by making it costly for banks to hold excess reserves at their central banks. Amid negative policy rates, nominal yields on some bonds of highly-rated European governments have also dropped below zero. Explanations for the phenomenon of negative yields include very low inflation, further “flight to safety” toward fixed income assets in Europe’s core, and—perhaps the main proximate cause—the increased scarcity of highly-rated sovereign bonds eligible for the European Central Bank’s asset purchase program. Negative rates may help boost exports by encouraging currency depreciation and may support lending and domestic demand by further easing credit conditions. At the same time, they could also have some adverse consequences for financial stability through an erosion of bank profitability, through funding problems for some non-bank financial institutions, and through excessive risk-taking by investors seeking a higher rate of return. Potential implications for developing countries include a search for yield supporting capital inflows, which could help offset the impact of an approaching liftoff in U.S. policy interest rates.*

As an additional measure to stabilize inflation expectations and stave off the risk of deflation, a number of major central banks in Europe—including the European Central Bank (ECB), the Danish National Bank (DNB), the Swedish Riksbank, and the Swiss National Bank (SNB)—have pushed key short-term policy rates into negative territory.<sup>1</sup> Amid these movements, yields on some sovereign bonds at relatively short maturities in several European countries—including Austria, Denmark, Germany, the Netherlands, and Switzerland—have also fallen below zero. Negative interest rates have been an extremely rare phenomenon: even during the Great Depression, U.S. short-term rates were never negative, and during the height of the recent global financial crisis in 2008 some U.S. Treasury bill yields only very briefly fell below zero.<sup>2</sup> That they have simultaneously appeared in several European

countries at a time when global financial markets are not in crisis is unprecedented.

This box briefly explores the causes and implications of negative interest rates and yields in Europe. It aims to shed light on the following questions:

- Why are some European policy interest rates negative?
- What are the implications of negative policy rates for sovereign bond yields?
- What are the implications of negative rates and yields for activity and financial stability?
- What are the implications for developing countries?

#### Why are some European policy interest rates negative?

In June 2014, the ECB pushed the policy interest rate applied on its deposit facility below zero, with an additional cut in September 2014. (Figure B1.1.1). In February 2015, the Riksbank also cut its deposit rate below zero. The main motivation for these decisions was to further ease the already accommodative monetary policy stance to fight the growing threat of deflation amid downward pressures to inflation expectations in the second half of last year and into early 2015 (Figure B1.1.1).<sup>3</sup> The SNB and DNB have also taken similar actions at different points in the past, albeit for slightly different reasons. The DNB, which maintains its currency within a narrow fluctuation band around the euro, was actually the first central bank in Europe to set its deposit rate below zero—in July 2012, in response to rising capital inflows amid heightened financial stress in the Euro Area. It pushed the rate down again to negative territory in September 2014, following the ECB. The SNB set its deposit rate below zero in December 2014 amid currency appreciation pressures, and pushed it further down in January 2015 when it abandoned the Swiss franc’s cap against the euro.

The implementation of these negative policy interest rates have a common element. Commercial banks nor-

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<sup>1</sup>The discussion of setting policy rates below zero is not recent. For instance, Mankiw (2009) argued that the U.S. Federal Reserve should have considered this possibility during the Great Recession

<sup>2</sup>Based on closing levels, U.S. 1-month and 3-month T-bill rates fell below zero between early December and mid-December of 2008.

<sup>3</sup>In the ECB’s case, an ongoing contraction of its balance sheet in 2013 and 2014 had weakened the overall transmission of low policy rates to broader financing conditions. The ECB reacted with an extended program of asset purchases, as well as a negative deposit rate (ECB, 2015).

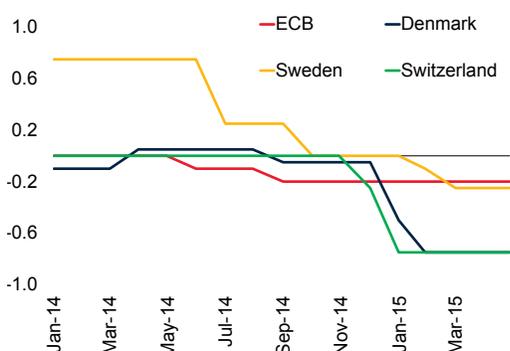
## BOX 1.1 (continued)

## Figure B1.1.1 Negative interest rates in Europe: Context

Some European central banks have pushed policy rates below zero, amid declining inflation expectations in the second half of 2014 and early 2015. Reflecting negative policy rates and increasing purchases of highly-rated sovereign bonds, some bonds now offer negative yields. Bank lending in the Euro Area is increasing, suggesting a supportive role of negative rates.

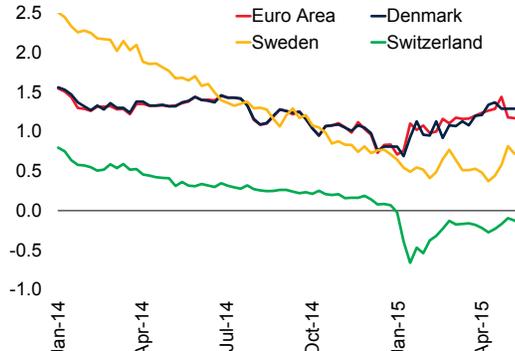
## A. Interest rates on excess reserves

Policy rate on excess reserves, percent



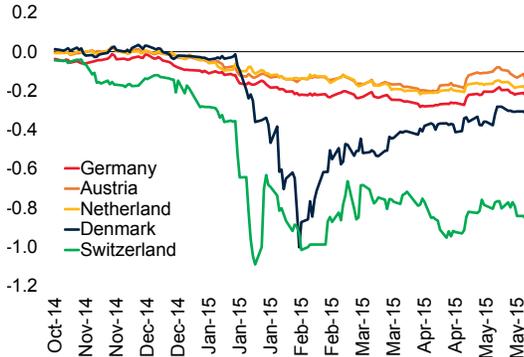
## B. Inflation expectations

4-year ahead inflation expectations, percent



## C. Two year government bond yields

Percent



## D. Euro Area bank lending

Euro, billions, 3-month rolling sum



Source: Bloomberg, World Bank.

D. Euro Area bank loans to households and non-financial corporates. Last observation is for March 2015.

mally hold deposits at their central bank as settlement balances for clearing payments, or to meet legal minimum reserve requirements. Central banks normally pay interest—a “deposit rate”—on commercial banks’ excess reserves (i.e. reserves above the minimum level). During normal times, banks usually minimize holdings in such excess reserves, because central bank deposit rates are below typical money market rates. In the

more uncertain environment since the global financial crisis, and with money market interest rates at very low levels, some banks have chosen to hold higher balances at central banks. That is, some of them have been holding excess reserves because of heightened risk aversion, and because the opportunity costs of hoarding reserves—in terms of profitable lending opportunities—have been quite low, given the low returns on assets and the sluggishness of economic activity.<sup>4</sup>

<sup>4</sup>In addition, unconventional monetary policies and the expansion of central bank balance sheets have significantly increased the amount of banks’ excess reserves.

The four aforementioned central banks are now charging (instead of paying) commercial banks for their ex-

**BOX 1.1 (continued)**

cess reserves. Negative deposit rates should provide some encouragement to banks to buy alternative assets, and hence to put upward pressure on prices of such assets and further downward pressure on yields and borrowing costs. This would be transmitted through the economy by a general easing of credit conditions. However, as is discussed below, negative policy rates have distinct implications for sovereign bond yields and, crucially, for financial stability.

**What are the implications of negative policy rates for sovereign bond yields?**

Policy rates provide the benchmark for short-term borrowing costs throughout the economy. This includes shorter-dated bonds. Thus, negative policy rates in the Euro Area, Denmark, and Switzerland have been accompanied by negative market rates on government bonds, particularly at the shorter end of the yield curve. For example, the 2-year bond yields on highly-rated European countries such as Austria, Denmark, Germany, the Netherlands, and Switzerland have been negative during the first half of 2015, though they have generally ticked up amid recent bond market volatility (Figure B1.1.1.C). Besides the role of negative policy rates, there are several potential explanations for the emergence of negative yields, particularly those beyond the short-end of the yield curve. These include very low inflation, the persistence of the international “savings glut,” and further “flight to safety” toward low-risk fixed income assets. In consequence, sovereign bonds of certain countries in Europe that are deemed risk-free have been in heavy demand.

That said, a key reason for negative sovereign yields in core European countries appears to be technical—a result of demand pressures stemming from the ECB’s Extended Asset Purchase Program, which is in turn a consequence of the design of the program. Purchases announced by the ECB, which will amount to €60 billion per month until at least September 2016 (for a total of €1.1 trillion), will mainly be of sovereign bonds, following a defined allocation, and strict eligibility criteria. These criteria prohibit purchases beyond 25 percent of the outstanding amount of individual securities, 33 percent of any given issuer’s debt, and of bonds with yields below the ECB’s deposit rate, cur-

rently set at –20 basis points. This lower yield limit is to ensure that purchases are implemented broadly across eligible bonds, and to curb speculation on future declines in bond yields. Such speculation would encourage holders, including banks, to hoard bonds. While the ECB deposit rate might establish a lower bound for bond yields, rising demand and limited supply of highly-rated sovereign bonds could bring their yields well below that rate. In addition, since bonds can be used as collateral in repurchase agreements, they have additional value which could keep them attractive with materially negative yields.

The prospects of growing imbalances between the limited supply of eligible bonds and rising demand under the ECB quantitative easing program have pushed down yields in core Euro Area countries and, indirectly, in other European countries. Overall, the net issuance of medium- and long-term securities by all Euro Area debt management offices in 2015 is expected to be around €200 billion, against total asset purchases of €600 billion by the ECB (Cœuré 2015). In some countries, including Germany, net issuance is expected to be marginal or even negative, creating a mismatch between effective supply and the intended scale of ECB’s purchases.

Investors initially held on to core-European bonds on expectation of further capital gains, which in itself helped push yields to record low levels in April. A reversal in market sentiment in May led to an upward adjustment in yields. However, scarcity considerations will likely continue to drive core-European bond markets, potentially intensifying if the share of eligible sovereign bonds trading with negative yields approach the lower limit for eligibility. This should keep yields at exceptionally low levels, and perhaps below zero for a while longer.

Investors may hold instruments with negative returns for various reasons, such as for speculative and arbitrage reasons, institutional and regulatory requirements, or simply for lack of alternative assets.

- **Speculative and arbitrage reasons.** Investors may be expecting increased demand for bonds—for example, due to the announcement by the ECB of

**BOX 1.1 (continued)**

bond purchases discussed earlier—and rising bond valuations. Alternatively, they may be expecting currency appreciation and rising returns when bond portfolios are converted into other currencies. This might be a particularly important channel of transmission of negative yields from the Euro Area to other European bond markets facing upward currency pressures as a result of ECB actions, such as Switzerland, Denmark or Sweden. In either case, total bond returns, adjusted for expected capital gains or currency movements, could compensate investors for negative home-currency yields.

- **Institutional and regulatory requirements.** Institutional investors often maintain portfolios with large government bond holdings in pursuit of stable, risk-adjusted returns to meet long-term obligations. Regulatory requirements on the level of risk that some institutional investors can take or agreements with stakeholders may drive these portfolio decisions.
- **Lack of alternative assets.** For non-bank investors, holdings of cash at zero return may appear to be more remunerative than a negative-yield bond. However, the security, transactions, and storage costs would be prohibitive for large holdings, which would result in a potentially substantially negative rate of return of cash.

### What are the implications of negative rates and yields for activity and financial stability?

Broadly speaking, central banks use policy interest rates to achieve, over the medium term, a level of real interest rates that is consistent with a rate of inflation in line with policy objectives and a level of economic activity close to its full potential. Such levels of real inter-

est rates might be negative in an environment of weak domestic demand.<sup>5</sup> With inflation remaining below target, they could require maintaining nominal policy rates at or below zero, along with the implementation of unconventional measures to bring longer-term rates further down, including asset purchase programs.

Thus, some of the effects of negative rates are qualitatively analogous to those of very low but non-negative rates. First, insofar as negative nominal rates help keep real interest rates below the neutral level, they can boost consumption and investment. Second, the positive cash flow effects of low or negative nominal rates permits increases in spending by liquidity-constrained firms and households. Third, low or negative policy rates may help stimulate lending, as evidenced by the recent pickup in credit in the Euro Area (Figure B1.1.1.D). Fourth, declines in domestic interest rates from any level can trigger a depreciation of the currency, as suggested by the fall of the euro vis-à-vis the dollar amid negative German yields (B1.1.2.A), which boosts exports. Fifth, in countries concerned about capital flow-driven appreciation pressures (e.g. Switzerland and Denmark), they discourage capital inflows.

In addition to these effects that are largely intended by policy makers, negative nominal interest rates may have undesirable side effects on financial stability and capital market functioning.<sup>6</sup>

- **Erosion of bank profitability.** Negative rates may erode bank profitability by narrowing banks' net interest margins (the gap between commercial banks' lending and deposit rates), since banks may be unwilling to pass through negative deposit rates to their customers to avoid the erosion of their customer base (Genay and Podjasek 2014, Hannon 2015). This unwillingness is due to the fact that, for retail depositors, the costs of avoiding negative rates by substituting currency for deposits is probably lower than for larger, business, and institutional investors (McAndrews 2015). As a consequence, interest margins have recently narrowed substantially (Figure B1.1.2.B). Compressed long term interest rates also reduce profit margins on the standard banking maturity transformation of funding short-term and lending at a somewhat longer term. However, banks can realize capital

<sup>5</sup>The chronically low levels of real interest rates has led some observers to argue that advanced economies may be facing a period of “secular stagnation,” where the level of spending at any given level of interest rates is likely to have declined and may remain depressed (Summers 2014).

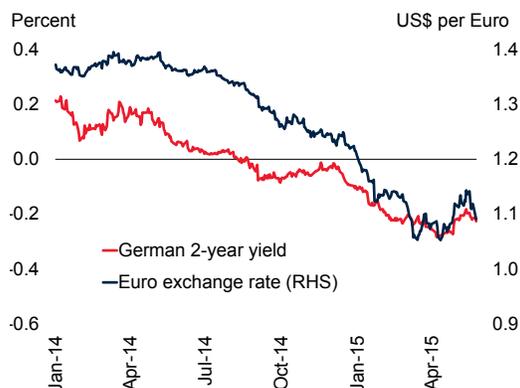
<sup>6</sup>In the United States, potential disruptions to financial market functioning are likely a key reason why negative policy rates have never been used as a policy option. First, money market funds operate under rules that make it difficult for them to pay negative interest rates. Second, the auction process for new U.S. Treasury securities does not currently permit participants to submit bids with negative rates. Third, a decrease in the interest on reserves (IOR) rate would affect the federal funds market, reducing the incentives for banks to borrow in this market (Keister 2011).

**BOX 1.1 (continued)**

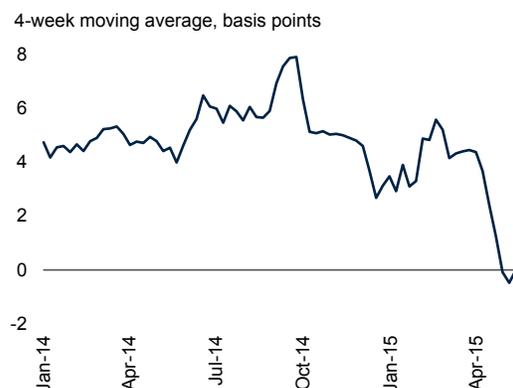
**Figure B1.1.2 Negative interest rates in Europe: Some consequences**

Negative European interest rates and yields have been accompanied by euro depreciation, despite a recent retracement. But negative rates have also been associated with a significant narrowing of spreads between bank lending and deposit rates, which may erode bank profitability. Regarding implications for developing countries, the difference between benchmark German and developing-country bond yields has widened, which has been accompanied by an acceleration in foreign inflows to developing-country bond funds.

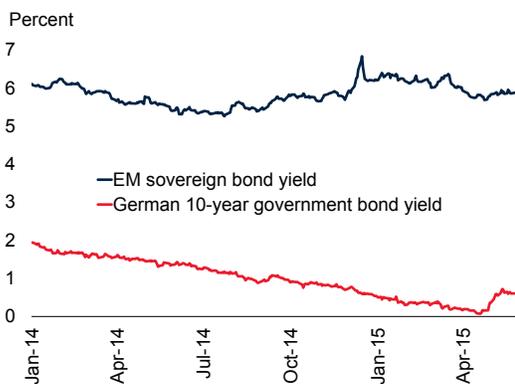
**A. Euro-dollar exchange rate and government bond yields**



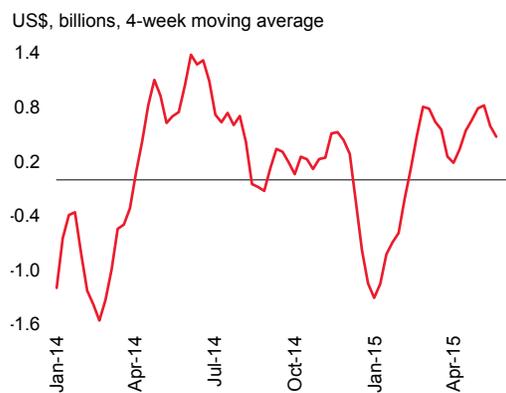
**B. Net interest margin for Euro Area banks**



**C. Benchmark government bond yields for Germany and emerging markets**



**D. Foreign portfolio flows into emerging-market bond funds**



Source: Bloomberg, Emerging Portfolio Fund Research, JPMorgan Chase, and World Bank.

B. Net interest margin is proxied by the difference in borrowing and lending rate of banks without compensating for the fact that the amount of earning assets and borrowed funds may be different.

gains on the sale of their government bonds to central banks and, in doing so, bolster their capital position and, therefore, their capacity to extend loans (Cœuré 2015).

- **Pressures on non-bank financial institutions.** Under negative interest rates, some non-bank financial institutions—especially pension and life insurance companies—may struggle to meet their

long-term liabilities, such as pensions or life insurance policies, offered at fixed nominal rates (Hannoun 2015). In particular, various European life insurance companies that have guaranteed payouts exceeding the yields on local 10-year government bonds are likely to face significant pressures (IMF 2015a). Insurance companies or pension funds might be constrained to hold government bonds by

**BOX 1.1 (continued)**

prudential requirements, hence contributing to the demand glut and downward pressure on yields.

- **Anomalies in the valuation of returns and payments streams.** As interest rates approach zero, the calculation of present values of streams of cash flows becomes increasingly sensitive to the discount rate.<sup>7</sup> Indeed, the present value of any stream can be made arbitrarily large by choosing a low enough discount rate. This becomes a contentious issue in the negotiation of fair value in legal settlements. As discount rates of zero or less have no economic meaning, a prolonged period of negative interest rates would create large ambiguities for the valuation of assets and liabilities.
- **Effects on money market funds.** Money market funds make conservative investments in cash-equivalent assets, such as highly-rated short-term corporate or government debt, to provide investors liquidity and capital preservation by paying a modest return. While these funds aim to avoid reductions in net asset values, this objective would not be attainable if rates in the market were negative for a substantial period.<sup>8</sup> Disruptive reactions by disappointed investors would best be avoided by clear understanding of the nature of these funds. That said, the Danish experience suggests that money market funds can pass through the negative rates without massive disruptions in the market (Huttl 2014).
- **Excessive risk-taking.** Bank and non-bank investors may be encouraged by negative rates to take excessive risk in their search for positive yield (Hannoun 2015). This is consistent with various studies that find a negative relation between short-term interest rates and bank risk-taking (e.g. Altunbas, Gambacorta, and Marqués-Ibáñez 2010; De Nicolò, Dell’Ariccia, Laeven, and Valen-

cia 2010; Dell’Ariccia, Laeven, and Suarez 2013). Greater risk-taking could contribute to the formation of asset bubbles, particularly in higher-dividend paying stocks which may already have excessive valuations.

- **Potential need to redesign the functioning of financial transactions.** The issuance of interest bearing securities at negative yields may face design problems (Garbade and McAndrews 2015). Contractual language surrounding the operation of money and capital markets may not envision the possibility of negative rates; thus, the latter may create both legal and operational challenges. More generally, if negative rates were to prevail for long, they may entail the need to redesign debt securities, certain operations of financial institutions, the recalculation of payment of interest among financial agents, and other operational innovations, whose costs may offset the benefits of negative rates (McAndrews 2015).

One key question is how deep negative rates must be for these kinds of distortions to become quantitatively important. According to some observers, in an economy like the United States, market rates (not to be confused with deposit rates on excess reserves) staying below  $-50$  basis points on a sustained basis might spawn various financial innovations to circumvent negative rates (Garbade and McAndrews 2012). Such adaptations would, in themselves impose an eventual floor, albeit somewhere below zero, on the extent to which rates could fall (Svensson 2015). However, these kinds of innovations, which uses valuable scarce resources, may impose a net loss in terms of economy-wide social value.

If they were to emerge, such financial innovations could include new services, such as the creation of new institutions to handle and store cash on behalf of others. It could also include new behavioral responses, such as making excessive tax payments to the government and earn a zero return until a refund is received from the government, thus avoiding negative rates (McAndrews 2015). At the extreme, if central banks pushed rates too far into negative territory, there is a risk that large sectors of the economy could become

<sup>7</sup>One way to describe the problem for pension and life insurance plans is to say that the steep drop in discount rates implies a steep rise in the present value of their liabilities.

<sup>8</sup>Money market funds may face adverse consequences even at zero, non-negative rates (Di Maggio and Kacperczyk. 2015).

**BOX 1.1 (continued)**

cash-based. Under these circumstances, there could even be discussions about the feasibility of a tax on money, a topic that has long been subject to debate in academic circles as a way to overcome the zero bound on interest rates (Buiter and Panigirtzoglou 2003, Ilgmann and Menner, 2011).<sup>9</sup>

The bottom line of all these factors is that, while the benefits of negative rates are broadly similar to those of very low but positive rates, they posit unique risks for financial stability.

**What are the implications of negative rates for developing countries?**

Current negative European policy rates highlight the asynchronous monetary policy stances in Europe and the United States. This could have implications for real activity and the financial sector in developing countries.

**Real effects.** The overall effect on developing-country exports via exchange rate movements is likely to be modest. The reduction in European rates has contributed to euro depreciation against the dollar. However, since developing-country currencies have also been declining against the dollar, the impact of negative rates on nominal and real effective exchange rates across developing countries may be contained.<sup>10</sup> As a result, the direct impact of negative rates on developing countries' exports may be limited as a whole, albeit with large country variations depending on specific trade exposures and currency developments.

**Financial effects.** Negative interest rates in Europe may accelerate portfolio outflows from Europe, and support continued favorable financing conditions for developing countries.

- *Widened interest rate differentials.* The interest rate differential between developing-country and European bond yields widened since the second half of 2014, as suggested by the gap between the JP Morgan EMBIG Index and the German 10-year

bond yield (Figure B1.1.2.C). Despite recent volatility, which has slightly narrowed this differential, German 10-year yields are generally following the same contour as (currently negative) short-term yields. Amid interest rate differentials, foreign inflows into emerging market bond funds have remained steady since the beginning of the year (Figure B1.1.2.D)

- *Increased search for yield and carry trade.* Negative European rates and yields could shift investor demand to higher-yielding emerging market debt and provide additional funding opportunities for developing countries in European markets. With negative nominal interest rates in Europe, there will also be incentives for increased carry trade, particularly to some higher-yielding developing-country currencies.
- *Moderated effect of eventual U.S. liftoff on developing-country capital flows.* Outflows from European sovereign to U.S. Treasury markets would have likely helped contain long-term yields in the United States, in the face of the approaching liftoff in U.S. policy rates, thus providing support to continued capital flows to developing countries.
- *Shifts in developing-country sources of funding.* Negative rates may be contributing to a gradual shift in the source of funding for some developing countries, from U.S. dollar- to euro-denominated debt instruments, and from bond to cross-border bank lending flows, which mainly originate from European lenders.

In sum, negative European interest rates may provide ongoing support to capital flows to developing countries and help reduce pressures from a gradual normalization of U.S. monetary policy (Special Feature 1). However, over the medium term, unsustainably low interest rates may render some countries more vulnerable to the eventual unwinding of exceptional stimulus measures in Europe and to a reversal of capital flows.

<sup>9</sup>There have even been discussions about the costs and benefits of phasing out paper currency as one way to eliminate the zero bound in interest rates (Rogoff 2014).

<sup>10</sup>Chapter 1 discusses this issue at greater length.