



BANCA D'ITALIA  
EUROSISTEMA

## The challenge of innovation

Address by Fabio Panetta  
Governor of Banca d'Italia

10<sup>th</sup> Annual Research Conference of the National Bank of Ukraine  
and the Narodowy Bank Polski  
*Central Banks Response to Future Challenges: Resilience, Credibility, and Innovation*  
Kyiv, 21 September 2026

### Introduction

Many thanks to Governor Andriy Pyshnyy and the conference organizers for their kind invitation.

Let me first express my deep solidarity with the Ukrainian people. For more than a decade, and especially since the full-scale invasion of 2022, Ukraine has defended its freedom and sovereignty with extraordinary courage and resilience. In doing so, Ukrainians have defended values that lie at the heart of the European project: democracy, freedom and the rule of law.

The theme of this conference – *Central Banks Response to Future Challenges: Resilience, Credibility, and Innovation* – could hardly be more timely.

Credibility is an essential asset of every central bank, but how it is built and preserved depends on the nature of the challenges we face. At times, credibility requires institutions to stand firm: to safeguard their independence, defend their policy framework and preserve their capacity to act under pressure. At other times, it requires them to adapt: to rethink their tools, acquire new skills and respond to structural changes in the economy and the financial sector.

Today, central banks are being tested on both fronts. Geopolitical fragmentation, wars and the weaponization of economic and financial dependencies are making the environment in which we operate more volatile and uncertain. The experience of the National Bank of Ukraine (NBU) shows what institutional resilience means, even under the most extreme circumstances.

Technological change poses a different challenge. Digitalization and artificial intelligence (AI) are transforming the economy, financial markets and payment systems. Here,

preserving credibility will increasingly depend on our ability to understand innovation and adapt to it.

I will start briefly with geopolitical tensions and resilience, a subject on which the NBU has far more to teach than to learn. I will then turn to the second challenge, technological innovation, which I would like to explore in greater detail.

## 1. The hryvnia at thirty

Let me start with something concrete: the hryvnia. Ukraine's currency turns 30 this year. When it was introduced, in 1996, it marked the end of a period of post-Soviet monetary instability.<sup>1</sup> Since then, it has accompanied Ukraine through three decades of profound economic and financial shocks and, for more than four years now, through the immense strain of a full-scale war.

The history of the hryvnia is inseparable from that of the institutions which have stood behind it. Each shock has tested the NBU: its independence, its policy framework and, ultimately, its credibility. A decisive turning point came after the crisis of 2014-15, when the hryvnia lost more than half of its value and the banking system underwent extensive restructuring. The NBU responded by strengthening its institutional framework, introducing inflation targeting and greater exchange rate flexibility, and adopting risk-based banking supervision.

Those reforms demonstrated their value when Russia launched its full-scale invasion in February 2022. Faced with exceptionally severe conditions, the NBU was nonetheless able to preserve monetary and financial stability, adapting its instruments to the demands of wartime. Inflation rose above 26 per cent in 2022. The policy rate was raised sharply, to 25 per cent. Although monetary transmission was impaired by the war, the monetary restriction – together with other measures – helped to contain pressures on the exchange rate and, over time, to bring inflation down. Meanwhile, the banking system continued to function and the institutional framework remained intact.<sup>2</sup>

These efforts have continued during the war. In February 2026, the IMF approved a new four-year Extended Fund Facility, explicitly recognizing the authorities' success in maintaining macroeconomic and financial stability under exceptionally difficult conditions.<sup>3</sup>

---

<sup>1</sup> The hryvnia entered into circulation on 2 September 1996 by Presidential Decree 762/96, replacing the karbovanets at a rate of 100,000:1.

<sup>2</sup> IMF, 'Ukraine: 2023 Article IV Consultation', IMF Country Reports, 23/299, 2023.

<sup>3</sup> IMF, 'IMF Executive Board Approves US\$8.1 Billion under an Extended Fund Facility (EFF) Arrangement for Ukraine', press release, 26 February 2026. IMF Managing Director Kristalina Georgieva stated that the Ukrainian authorities had 'maintained macroeconomic and financial stability' despite the prolonged war. Total disbursements under the 2023 EFF reached \$10.6 billion across eight completed reviews.

At the same time, regulatory alignment with the European Union has continued to advance.<sup>4</sup>

Ukraine's experience provides valuable lessons for central banks. Credibility is not earned when a crisis strikes. It is built up over time through sound institutions, disciplined policymaking and a willingness to undertake difficult reforms. It is then put to the test when circumstances become extreme.

## 2. Central banking in the age of AI

Let me now turn to technological change, which tests a different aspect of credibility: the capacity to adapt.

Generative AI is spreading at exceptional speed. Its adoption has outpaced that of personal computers and the internet at comparable stages, while consumer applications have reached mass use within a very short period of time.<sup>5</sup> This rapid diffusion builds on the digital transformation of recent decades. Digitalization has provided the data on which AI models are trained and the digital infrastructure that allows them to operate at scale.

The consequences extend far beyond technology itself. AI is set to transform productivity and growth, change labour markets and firms, and redefine financial markets and payment systems.

Central banks cannot remain on the sidelines. Our economic models, supervisory tools and payment infrastructures were primarily designed for a different technological environment. We need to understand the changes under way, disentangle structural shifts from temporary effects, and adapt our instruments accordingly.

This is increasingly part of what central bank credibility requires. Credibility no longer depends solely on delivering price stability and safeguarding independence. It also depends on our capacity to understand profound changes in the economy and to respond to them without losing sight of our mandate. Our ability to adapt is therefore becoming increasingly important for retaining public trust.

---

<sup>4</sup> The level of Ukrainian banks' regulatory equivalence with EU standards increased from 50 per cent in 2022 to 78 per cent in 2025; see S. Nikolaychuk, 'Integrating Ukraine's Financial Sector into the European Framework in Wartime: Challenges and Strategic Gains', keynote speech at the dinner of the AFME (Association for Financial Markets in Europe) European Financial Integration Conference 2026, Frankfurt am Main, 19 May 2026. The target is full equivalence by the end of 2027; see Cabinet of Ministers of Ukraine, Resolution 438, National Programme for the Alignment of Ukrainian Legislation with EU Law, 2026. For the official opening of the fundamentals cluster see the relevant [European Council announcement](#).

<sup>5</sup> See Figure 4 in F. Panetta, 'The Governor's Concluding Remarks for 2025', Banca d'Italia, Rome, 29 May 2026. Generative AI reached 50 per cent household adoption in the United States in around three years – faster than the internet (over ten years) and mobile phones (around seven years).

### 3. AI and monetary policy

The first area in which this challenge becomes visible is monetary policy. Here, AI matters in two ways.

First, it can improve the tools we use to understand the economy. AI can help us extract information from large and unstructured datasets, identify patterns that conventional methods may miss, and thereby improve forecasting. Second, and more fundamentally, AI is changing the economy itself. It will affect both demand and supply, and it will do so over very different time horizons.

Understanding its implications for growth and inflation is therefore far from straightforward.

In the short term, AI-related investment is already providing a powerful boost to demand, especially in economies at the technological frontier. It is also generating strong demand for computing capacity, energy, specialized labour and other scarce inputs. Until supply catches up, these pressures may push up relative prices and inflation.

Over the longer term, the dominant effect is likely to come through productivity. The scale of the gains remains highly uncertain, but their potential is considerable. For Italy, research by Banca d'Italia suggests that widespread AI adoption could raise labour productivity growth by more than 1 percentage point per year.<sup>6</sup>

What would this imply? Higher productivity is, in principle, a favorable supply shock: it expands the economy's productive capacity and, other things being equal, supports stronger growth and lower inflation.

But that is where the simple part of the story ends. The timing, magnitude and transmission of these effects are highly uncertain. Moreover, a positive supply shock does not operate in isolation: it affects incomes, investment, wealth and expectations, and therefore also aggregate demand.

This raises two important questions for monetary policy. How strongly will AI affect aggregate demand? And will its diffusion widen economic divergences across the major economies?

#### 3.1 Will AI boost aggregate demand?

As for aggregate demand, the starting point is simple: large supply shocks are bound to spill over to demand. By impacting incomes, wealth and expectations, they also

---

<sup>6</sup> F. Panetta, 'The Governor's Concluding Remarks for 2025', Rome, 29 May 2026. See also A. Bertolotti, A. Linarello and P. Zoi, 'Shock propagation and economic policies in the Italian production network', Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers), 1020, 2026.

affect consumption and investment.<sup>7</sup> AI will be no exception. The key question is whether these effects will reinforce or offset the disinflationary impact of higher productivity.

Much will depend on what happens in the labour market and, in particular, on how the gains from AI are shared.

The use of AI can follow two distinct paths.<sup>8</sup> One is automation: machines replace tasks previously performed by workers, reducing labour demand and shifting income towards capital. The other is the creation of new tasks, through which AI complements human capabilities, increases the demand for skills and allows workers to share more fully in productivity gains.

These two paths could have very different macroeconomic consequences. If AI mainly creates new tasks and increases expected labour income, households may feel wealthier and more confident about the future. Consumption could strengthen, adding to the investment boom already under way. In that case, demand could rise before the full productivity benefits of AI materialize, and inflationary pressures could persist for longer.

If, instead, automation dominates, greater uncertainty about jobs and wages could induce households to save more and consume less. Weaker consumption could then offset part of the investment boom, causing the disinflationary effects of AI to emerge sooner.

The reality will probably lie somewhere between these two extremes. And the effects are likely to be uneven across workers, firms and sectors. Some workers will be better placed than others to benefit from the way AI complements their skills.<sup>9</sup> Larger firms may be able to adopt the technology more quickly and effectively than smaller ones, potentially reinforcing market concentration.<sup>10</sup>

For monetary policy, the implication is clear: estimating the productivity effects of AI will not be enough. We will also need to understand who benefits from those gains, because their distribution will help shape aggregate demand and, ultimately, inflation.

---

<sup>7</sup> F. Panetta, 'Playing the long game: how should monetary policy adapt to the Great Reconfiguration?', speech at the closing conference of the ESCB Research Network on Challenges for Monetary Policy Transmission in a Changing World (ChaMP), Rome, 7 July 2026.

<sup>8</sup> D. Acemoglu, D. Autor and S. Johnson, 'Building Pro-Worker Artificial Intelligence', NBER Working Paper, 34854, 2026.

<sup>9</sup> As of now, the evidence suggests that high-skill, high-wage workers might be more exposed to AI, but also better equipped to exploit complementarities and use the technology to increase their own productivity; see E. Rockall, M.M. Tavares and C. Pizzinelli, 'AI Adoption and Inequality', IMF Working Paper, WP/25/68, 2025.

<sup>10</sup> T. Babina, A. Fedyk, A. He and J. Hodson, 'Artificial intelligence, firm growth, and product innovation', *Journal of Financial Economics*, 151, 2024.

### 3.2 Will AI widen economic gaps across countries?

The second question is whether AI will widen economic gaps across countries.

AI development is already having markedly different effects across economies. In the United States, which is at the forefront of the technological race, AI-related investment has become an important engine of growth, contributing to a widening of the trade deficit<sup>11</sup> and attracting substantial foreign capital into equity markets.<sup>12</sup> Europe, which lags behind in AI development, has so far experienced these effects on a much smaller scale.

Looking ahead, however, adoption will be key to unlocking the full potential of AI. Here, the picture is more fluid and more uncertain.

The United States appears to be moving faster than Europe,<sup>13</sup> but the gap is not set in stone. Even if Europe does not become a leading developer of AI, it has the potential to adopt and exploit these technologies as rapidly as other advanced economies.

Differences in adoption rates could therefore become highly consequential for growth. Estimates by Banca d'Italia staff suggest that countries which integrate AI more rapidly could secure a lasting productivity advantage, expand their shares of global markets and attract more investment and capital. Others would risk seeing their relative competitiveness decline.

Differences in productivity and demand would also affect trade flows, capital flows and relative prices. Exchange rates would be part of this adjustment process and could become more volatile during the transition. The direction of exchange rate movements, however, is uncertain: depending on the effects on domestic demand and external balances, currencies could either appreciate or depreciate.<sup>14</sup> For Europe, these external adjustments could be particularly important given its deep integration into global trade and capital markets. AI could therefore affect monetary policy not only through productivity and labour markets, but also through terms of trade and exchange rates.

---

<sup>11</sup> L. Carpinelli, F. Natoli and M. Taboga, 'Artificial intelligence and the US economy: an accounting perspective on investment and production', Banca d'Italia, *Questioni di Economia e Finanza* (Occasional Papers), 1006, 2026; G. Fiori, C. Lipa and E. Nuenninghoff, 'Technology Shocks, the AI Boom, and the U.S. Current Account', FEDS Notes, 14 July 2026.

<sup>12</sup> According to US Treasury TIC data, net foreign purchases of US equities totalled \$742 billion in 2025, and more than \$260 billion flowed into US equity markets in the first five months of 2026.

<sup>13</sup> See, for example, A. Bick, A. Blandin, D. Deming, N. Fuchs-Schündeln and J. Jessen, 'Mind the Gap: AI Adoption in Europe and the US', CEPR Discussion Paper, 21337, 2026.

<sup>14</sup> N. Gornemann, P.A. Guerrón Quintana and F. Saffie, 'Real Exchange Rates and Endogenous Productivity', *American Economic Journal: Macroeconomics*, 17, 4, 2025, pp. 204-261.

### 3.3 What does this mean for monetary policy?

Taken together, these effects make it unusually difficult to assess how AI will affect output and inflation over the medium term.

The same uncertainty applies to the natural rate of interest, an important benchmark for monetary policy. Faster productivity growth would tend to raise  $r^*$ , but other effects could pull in the opposite direction: greater inequality, higher precautionary saving or a larger share of income accruing to capital could all push it lower.<sup>15</sup> The overall effect is therefore uncertain – and likely to evolve over time as AI spreads throughout the economy.

The transition may be far from smooth. Current asset prices reflect optimistic expectations about the future profitability of AI. These valuations help technology firms raise capital and sustain further investment, but they also leave markets vulnerable to sharp corrections when expectations are not met, as recent volatility in technology stocks has illustrated.<sup>16</sup>

All of this argues for caution in drawing firm conclusions about the appropriate monetary policy stance. Central banks should remain pragmatic and data driven. In an environment of rapid structural change, where unobservable variables are particularly difficult to estimate, actual developments in demand, economic activity and inflation should carry greater weight in guiding monetary policy than estimates of the neutral rate.<sup>17</sup>

As the AI revolution unfolds, central banks will need to continually refine their analysis of the economy, their models and the information on which they rely. Our investment in knowledge, skills and analytical capacity must keep pace with the transformation taking place outside our institutions.

## 4. Beyond monetary policy

So far, I have focused on monetary policy, but the implications of AI and digitalization extend well beyond it, to financial supervision, financial stability and payment systems.

In banking, for example, AI can improve credit assessment, fraud detection and risk management,<sup>18</sup> but it can also create new vulnerabilities. If many banks rely on similar

---

<sup>15</sup> P. Hartmann and V. Mavris, 'Implications of Artificial Intelligence for Monetary Policy: A First Conceptual Assessment', SUERF Policy Brief, 1080, 2025; and L. Esposito, E. Guglielminetti, E. Moracci, A. Papetti and M. Pisani, 'The implications of AI for monetary policy: a first assessment', Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers), 1051, 2026.

<sup>16</sup> R.J. Caballero, 'Speculative Growth and the AI 'Bubble'', NBER Working Paper, 34722, 2026, adapting R.J. Caballero, E. Farhi and M.L. Hammour, 'Speculative Growth: Hints from the U.S. Economy', *American Economic Review*, 96, 4, 2006, pp. 1159-1192; M. Taboga, 'The Reaction of Financial Markets to the Releases of DeepSeek R1 and Kimi K3: A Critical Analysis', Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers), forthcoming.

<sup>17</sup> F. Panetta, 'The ECB must stay pragmatic in setting rates', *Financial Times*, 26 March 2025.

<sup>18</sup> L. Gambacorta, F. Sabatini and S. Schiaffi, 'Artificial intelligence and relationship lending', Banca d'Italia, Temi di Discussione (Working Papers), 1476, 2025.

models or on a small number of technology providers, errors or disruptions may propagate rapidly across the financial system. Supervisors will need stronger technical expertise and a deeper understanding of models, data and technological interdependencies.

Digitalization is also transforming payments. New providers and faster payment services can increase competition and efficiency, but they can also make the payments ecosystem more complex and fragmented, creating new operational, legal and cyber risks.

The challenge for central banks is to ensure that innovation does not weaken the foundations of monetary and financial stability. In the field of payments, this means adapting the existing two-tier monetary system – with central bank money as the anchor and private money and payment services as the operating layer – rather than abandoning it.

## Conclusion

In conclusion, geopolitical fragmentation and technological change pose very different challenges for central banks, but they raise the same fundamental question: how do we maintain credibility when the environment around us is changing profoundly?

The experience of the National Bank of Ukraine confirms that credibility is built over time and tested under pressure. Technological change poses a different kind of test: it requires central banks to adapt their analytical frameworks, skills and instruments as the economy and the financial system evolve.

Adaptation, however, does not mean abandoning our foundations. Price stability, financial stability and trust in money remain our anchors. Depending on the circumstances, credibility may require central banks to stand firm or to adapt. Their task is to understand how the world around them is changing, respond within their mandate and preserve the public trust on which money ultimately rests.

Thank you for your attention.