

Shifting Paradigms in Real Investment Determinants: Insights from Orthodox and Heterodox Economics for Industry 5.0 and the SDGs

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ABSTRACT

Real investment is an important and most volatile component of aggregate demand, playing pivotal role in explaining economic fluctuations in output and employment levels and the long-run growth trajectories of an economy. The present research article is an attempt to analyze and document the dynamism in the determinants of real investment through the lenses of Orthodox and Heterodox approaches of economics. The study traces the transformation of these determinants from early school of economic thoughts to contemporary frameworks and highlights the important paradigms shifts that can affect businesses and investment decisions. Also, the study makes an attempt to logically colligate these changing determinants as foundation of Industry 5.0. Finally, it underscores the importance of these dynamic determinants in navigating forward thinking policies aligned with SDGs targets.

KEYWORDS: Investment, Policy coordination, Interest rate, Innovation, Industry 5.0, Sustainability

JEL CODES: E22, E61, E43, O31, O14, Q01

Introduction

Investment holds immense significance for the effective and efficient functioning of economies in this modern world. It is an important and most volatile component of aggregate demand that determines the output, employment, and price level in the economy. In ancient schools of economics, which include the Ancient Indian school of economics, Ancient Greeko school, Ancient Chinese and Roman schools, Islamic school, and Mercantilist school, i.e., late ancient to early modern, investment determinants vary across state policies, wealth and resource availability, ethics, social welfare, taxation, land and agriculture, exports, trade and commerce, Sharia compliance (compliance of Islamic laws), Riba (prohibiting interest), Mudarabah (profit sharing), Zakat (charity), and accumulation of gold and silver (driving investments in mining and trade). All the determinants under the ancient school of economics reflect how these schools entangled economic activity with ethical, political, and societal contexts. However, in modern economic literature, it has roots from the classical school of economic thought; however, it gained explicit importance from “The General Theory of Employment, Interest, and Money” by John Maynard Keynes in 1936. Keynes had stated the main cause of depression in 1929 was a lack of effective demand that was primarily caused by falling private investment. So, investment acts as a fiber for the economy, as it has a notable impact upon other components of aggregate demand such as

consumption, government expenditure, and net exports. The present review article explicitly deals with the real investment, which is expenditure incurred in addition to the existing stock of physical capital, but this meaning has evolved over time. Initially, it was confined merely to fixed assets such as plants and machinery, but with the adoption of dynamism, real investment has widened its dimensions to human capital, green technologies, sustainable institutions, etc. As being rooted in mainstream economics, the investment determination is strongly influenced by a price-centric approach based on pillars of rationality, scarcity, regulation, etc. The real investment has strong links with nominal variables as well, as “money supply not only affects relative prices but also affects the inflation rate and real variables, such as investment, the natural rate of unemployment, and potential GDP, through the change in relative prices” (Silva Moreira et al., 2016). Meanwhile, in heterodox economics, investment is based on an institution-centric approach that focuses on the incorporation of elements of reality and captures the behavioral aspects of agents. So, this research article aims to discern the evolution of real investment determinants under the philosophy of mainstream and heterodox economics while unfolding the pioneering determinants to break the adamant of conventional paradigm in investment decisions. These insights further lead to strategic investment decisions by harnessing the potential for unconventional forces of dynamic and innovative economic landscape. The next section of this research article discusses the methodology which has been utilized to trace the dynamism in the determinants of real investment from ancient schools to contemporary framework and indicates the gaps for future research.

Research Methodology

The present research article adopts a theoretical review and qualitative methodology. It follows a historical evolutionary approach to underscore how real investment determinants have evolved from ancient schools to modern Industry 5.0 framework? The subsequent sections and subsections of the present research article are devoted to trace the dynamism in the real investment determinants from existing literature related to different schools through orthodox and heterodox contours of economics.

Review related to Real Investment determinants in the Mainstream Economics

Mainstream economics is that branch of economics that puts emphasis on the assumption of scarcity, rational decision-making, efficiency, market equilibrium, etc. and has an orthodox philosophy. This domain is associated with marginalism, perfect competition, stable equilibrium, and optimization with a special focus on policies, expectations, etc. Mainstream economics is characterized by the comprehensive use of mathematical models to analyze and accentuate the optimization of economic variables. Basically, it looks at the economic variables through the lenses of efficiency, rationality, and coordination while ignoring the institutional framework, power dynamics, and uncertainties associated with these variables. This article presents the ideas of the classical to new Keynesian school of thought in real investment determination, associated with mainstream economics. The subsequent sections are dedicated to the determinants under different schools of thought affiliated with mainstream economics.

Review related to Classical School’s perspective on Real Investment determinants

A classical school of thought emerged on the landscape of the industrial revolution that has succeeded the agricultural and chemical revolution. Adam Smith, Ricardo, Malthus, J.B. Say, and

J.S. Mill were the prominent names in this school of thought and emphasized the role of real variables in output and employment determination of the economy, based on the ideas of laissez-faire, self-interest, full employment, capital accumulation, flexibility of money wages, and prices. “In classical finance, savings also act as a foundation for investment. Classic economists see savings as another form of spending on buying investment goods, meaning that each savings necessarily turns into an investment, so that it cannot lead to a reduction in aggregate demand, that the national income is spent in full.” (Alzghoul et al., 2023). Classicals mentioned that when income is fully spent, the economy is in a progressive state, implying a higher rate of profit. The profit serves as the base of capital accumulation, an important determinant of investment. To generate profits, capitalists tried to lower the cost of production by improving labor productivities, so investment in fixed assets and division of labor to attain specialization in production process, as there is a positive relationship between investment and unit labor costs (Boundi-Chraki & Perrotini-Hernández, 2024).

However, it is empirically verified in 13 EU countries that the profitability index measured by the incremental rate of profit (IROP) is an important determinant of investment in the short run, but in the long run, the investment behavior is influenced by the overall state of the economy, not just by the profit rate (Alexiou et al., 2016). So, in the classical school of thought-saving, capital accumulation and profit, along with labor costs, act as major determinants of real investment.

Review related to Neo-Classicals School’s perspective on Real Investment determinants

Alfred Marshall, Jevons, Pareto, and Walras were the eminent economists under this neo-classical school of thought. This school was the true originator of mainstream economics, which has propounded the concept of marginalism and promoted the assumptions with the classical basics. Neoclassicals have viewed the interest rate as a major determinant that inversely varies with investment (Bernanke S. Ben, 1983). Another determinant is the user cost of capital and marginal product of capital, where the optimum stock of capital will be determined by the equality of user cost of capital and marginal productivity of capital (MP_K) (Jorgenson, 1963). In a perfectly competitive market, the user cost of capital (the cost of using own capital) will equate to the real rental price (the cost of using hired capital). So, if MP_K is greater than real rental price (user cost of capital), then investment will increase, and if MP_K is less than real rental price (user cost of capital), then investment will decrease. Depreciation, corporate tax, and maintenance costs also play a significant role in this context. The rate of depreciation raises the user cost of capital, while the maintaining cost prevents the capital from depreciation, resulting in a lower user cost of capital and stimulating investment. Along with this, higher corporate taxes raise rental prices and discourage investment, and vice versa. However, this view of taxation is contradictory, as reducing the taxation rate will lead to budget deficits, and financing budget deficits through borrowing will raise the cost of capital, resulting in reduced investment (Gale & Orszag, 2005). Thus, the neo-classical synthesis school has emphasized the role of marginalism, cost of capital, interest rate along with profit and capital accumulation, etc. on the real investment.

Review related to Keynesian School’s perspective on Real Investment determinants

The foundation of Keynesian school was laid by John Maynard Keynes with his revolutionary work “The General Theory of Employment, Interest, and Money” in 1936. Richard Kahn and Joan

Robinson Kalecki were the notable figures in this school. As per Keynes, both short-term and long-term business expectations plays a pivotal role in determining the investment levels in the economy (Gennaioli & Bocconi, 2016). If the investor thinks that current demand will sustain in the future, then this represents high investment because of optimistic expectations. In the long run, this scenario will be based upon the future stock of capital along with changing demand scenarios, and prospective yield will act with the waves of pessimism and optimism that create volatility in investment level. Keynes advocated the role of MEC (Marginal Efficiency of Capital), that is, the expected rate of return over the additional unit of capital employed given the supply price. It is a stock concept which determines the optimum-level of capital stock in the economy. Higher MEC implies higher investment in the economy as it generates sufficient demand in the economy, and “insufficient demand is just a consequence of a previously overheated economy faced with the drop of MEC,” leading to crisis (Stojanov, 2009). Then Kenneth E. Boulding and Paul Samuelson added a new dimension of Marginal Efficiency of Investment (MEI), a flow concept that shows the expected return of only those capital units that are over and above of existing capital stock and positively associated with net investment (Wijkman, 1965). Keynesian thought is also associated with multiplier and accelerator working. Multiplier was first introduced by R.F. Kahn in 1931 to show the employment effect of investment; later, it was popularized by John Maynard Keynes. Multiplier signifies the change in income level due to investment, while accelerator is quite opposite of multiplier in its effect. This concept was introduced by Albert Aftalion and Thomas Carver before the introduction of the multiplier by Keynes. This represents change in the investment due to a change in the income level, and accelerator has a significant impact on the investment level (Mourão & Popescu, 2023), specifically induced investment. Then this concept is extended as a flexible accelerator by Hollis Chenery, incorporating the impediments like non-availability of finance, gestation period of capital goods production, no permanent increase in demand, and capacity utilization of existing stock of capital as determinants of investment level in the economy. Multiplier and accelerator do not work independently; they have a reinforcing effect on each other due to their interaction called super multiplier. The “explanation of business investment, which has always been favored by empirical evidence and the super multiplier model, is for us a useful tool to draw the theory’s important long-run implications field (Serrano et al., 2022). Keynesians also favor fiscal policy to ensure a position with a low deficit and debt level that represents the fiscal prudence and credibility to incentivize investment in the country. On the other hand, fiscal imprudence may lead to fiscal default risk, generate an excessive pessimistic view about investment, and have a negative impact on private investment levels in the economy (Afsono Antonio and Tovar Jalles, 2015). So, it can be stated that the Keynesian approach has been revolutionary and dynamic in demystifying the real investment determinants.

Review related to Neo-Classical Synthesis School’s perspective on Real Investment determinants

The school of thought associated with the work of Hicks, Henson, Solow, Samuelson, etc. is based on the integration of neoclassical and Keynesian ideas. Hicks & Henson have propounded the two-dimensional IS-LM frameworks of an economy. Here, income acts as a cornerstone in investment determination through the saving and income relationship as S-I equality, an intersecting fact field (Miller, 1952). As income increases, saving also increases due to the positive association between these two. Another important factor is coordination of fiscal and monetary policy, as “policymakers and economists in virtually all countries with separated monetary and fiscal policies believe that their countries suffer from fiscal deficits and real interest rates that are too high to

promote a healthy level of private investment and adequate long-term growth of potential output” (Nordhaus et al., 1994).

Review related to Monetarist School’s perspective on Real Investment determinants

Milton Friedman, Fredrick Hayek, and Schwartz advocated the concept of non-neutrality of money in the short term and its effect on real variables such as investment, output, etc. in the monetarism school of thought. This review article highlights the role of credit, inflation, monetary policy, etc. (Franco Modigliani, 1970) in the determination of real investment. Money supply or expansion of credit will lower the interest rate and stimulate investment in the economy due to the inverse relationship between interest rate and investment. In the recessionary phase, the central bank exercises expansionary monetary policy that promotes liquidity infusion by supplying credit at lower rates, and these low interest rates attract producers to borrow more funds for productive activities and stimulate investment. During the period of prosperity, contractionary monetary policy is being exercised that raises interest rates and lowers the investment level in the economy. However, an empirical study in Italy has suggested that the elasticity of investment to credit availability has been more significant in periods of contraction than any other period (Gaiotti, 2011). Another nominal variable is Inflation and q coefficient. A low level of inflation promotes stability in an economy that is conducive for investment. “The empirical estimates show that investment in non-residential buildings and structures and in machinery and equipment is strongly negatively related to inflation, which suggests that the low inflation environment in the 1990s has been an important contributor to the high investment activity over the past decade in the OECD countries” (2003). Whereas the q coefficient was given by James Tobin (1969) in his financial theory of investment that relates the level of investment to the performance of the stock market. The q coefficient is the ratio of the market value of capital stock to the replacement cost of the capital stock. If this q coefficient is greater than one, then the investment level will get increased, and if the q coefficient is less than one, then it implies a decrease in investment. Although Tobin was not strictly monetarist, this view has supported the monetarist thought. The global financial crisis of 2008 and eurozone crisis were also the result of a stock market crash that resulted in the downturn of investment in the economy, as q is a main determinant for explaining company-level investment (Blundell et al., 1992).

Review related to New-Classical School’s perspective on Real Investment determinants

This school emerged in the 1970s on the pillars of rational expectations, efficient markets, neutrality of money, and real business cycles. Robert Lucas and Thomas were the main proponents of this school of thought. The ideas of this school regarding investment determinations are based on technological shocks, globalization, exchange rates, etc. Globalization adds new parameters of growth, i.e., increased market size, international competition, technological development, etc. So, globalization acts as a constellation of forces that generate economies and opens the door for new investment by encouraging both domestic physical and human capital in the economic field (Hickman & Olney, 2011). The real business cycle theory also suggests a significant relationship between investment and technological shocks. The empirical study based on Mexico and U.S. data to quantify the investment-specific technological shocks found that the shock explains 80 percent of investment variability (Field, Dogan, 2016). Additionally, exchange rate and interest rate

disparities also have an influential impact on real investment prospects as they strengthen the saving-investment interaction (AmirKhalkhali & Dar, 2007). A stable exchange rate is an indication of economic resilience that promotes investment in developing countries, whereas weak and volatile currency disincentives the private investment trajectory (Servén & Servén, 2003). This school also endorses the role of interest rate disparities, as higher real interest rates seem to promote both financial and total savings and stimulate private investment (Field)(Athukorala, 1998). As large as the disparities are, real investment will be more inclined towards the economy with a high interest rate and vice versa.

In contrast to this, the study by M. Karimo (2021) shows that “interest rate differential does not explain the dynamics of aggregate capital and foreign direct investment (FDI) flows but significantly explains foreign portfolio investment (FPI) flows. Also, movement in real exchange rate is significant in explaining outflows and inflows in FPI and inflows in FDI, but neutral to aggregate capital flows.”

Review related to Supply-Side School’s perspective on Real Investment determinants

This school of thought focuses on the role of supply-side measures to boost economic activity. Aruther Laffer and Friedrich Hayek were the leading economists under this school who have propounded the ideas that will directly impact the real investment scenario, such as tax rate cuts, political stability, and deregulation of the economy. Taxation distorts the ability of the owner to take investment risk as it does not only affect the profit level but also the rental cost of capital and is positively associated with this. Higher corporate tax will stimulate the higher rental price and low level of investment and vice versa, as stated in the neoclassical theory of investment (Boadway, 1980). So, tax rationalization will act as a good mechanism for promoting real private investment, especially in emerging market economies. This school of thought also strongly advocates stable political institutions and deregulation policy. A stable political environment promotes corporate investment by decreasing financing costs, reducing uncertainties, and creating resilient institutions (Naeem & Li, 2019). In addition to this, a complex regulatory environment discourages investment compared to a liberalized economy. Less entry and exit regulations do not only encourage domestic players but also attract MNCs to invest more in an economy and tap the foreign potential than the economies with stronger contract enforcement (Contractor et al., 2020). So, policymakers should prioritize the ease of doing business and ease the norms of regulatory compliance for creating a vibrant ecosystem for investment.

Review related to New-Keynesian school’s perspective on Real Investment determinants

Gregory Mankiw, David Romer, and John Taylor have extended the Keynesian thoughts of aggregate demand and nominal rigidities, and this extension has emerged as a new Keynesian school. The key idea is micro-dynamics as a driver of macro variables and suggests the profound impact of the imperfection of markets, monetary policy, variable rigidities, etc., on real investment. Imperfection in market structure will augment the investment level in the economy, especially labor market rigidities will imply substitution of labor with capital if financial markets are efficient (Calcagnini et al., 2019). Another influential variable in this study is inflation targeting, as it impacts all the micro and macro segments of the economy. Optimal inflation targeting through appropriate policy will be conducive for real investment as it provides welfare gains with a low

optimal inflation rate by promoting price stability. There also exists a positive association between FDI and inflation targeting, and this effect is stronger in developed nations compared to developing nations (Mason, 2017). So, inflation targeting taps the ability to maximize efficiency that acts as an instrument for the flourishing of real investment in the economy.

Now, the next section of this review article decodes the real investment determinants under the ambit of heterodox economics.

Review related to Determinants of Real Investment in Heterodox Economics

The branch of economics that has challenged mainstream economics through a broad spectrum of economic schools of thought. It provides nuanced insights by assimilating historical context, social and ecological considerations, imperfection, instability, uncertainty, and institutional structure. This domain reproaches the rational behavior and expectations, perfect competition, and efficient markets of mainstream economics. Under this, Marxian, Austrian, post-Keynesian, institutional, and ecological schools of thought are considered to examine the determinants of real investment and their significance in the current scenario. The subsequent sections of this article explore the various determinants of real investment in these schools of thought.

Review related to Marxian School's perspective on Real Investment determinants

The Marxist school of thought is based on the ideas of "Karl Marx" that comprehend the dynamics of class struggle, capitalism, surplus value, labor, and the process of economic development. As per Karl Marx in his book "Das Capital Volume-1," the surplus value, which is generated by the difference between the value of output and wages paid to the labor, is a determinant of investment. This surplus value is the profit for capitalists, and this profit is reinvested for capital accumulation that raises the share of constant capital, which is a form of real investment. And as the share of constant capital in total capital rises and labor share declines, the surplus value also declines. Declining surplus value implies falling profit rate, and the process of capital accumulation will slow down, which adversely impacts real investment.

Review related to Austrian School's perspective on Real Investment determinants

Carl Menger, Fredrick Hayek, Schumpeter are the prominent names of Austrian school. This school emphasized the role of entrepreneurs and individual choices in the functioning of the economy, which in turn determines the investment in the economy. Schumpeter emphasized the role of innovation as a catalyst for the expansion of investment in his book "The Economic Theory of Development" in 1911. Innovation and entrepreneurial capability of risk-taking are significant determinants of investment in the economy. Here, innovation acts as a creative destruction that destroys the old circular flow in the economy and generates new flows in the economy. When an entrepreneur innovates, it drives the waves of optimism, and "rising prices and high rates of profits stimulate producers to raise investments by borrowing from the banks" (Langroodi & Langroodi, 2021). Technological penetration in all spheres of economic activities also promotes the investment in the economy. It will also lead to more investment because of the growth of big data, business analytics and outsourcing of business services, etc. In the information age, mobile

technology is also a causative agent of investment from the micro to macro sphere. The penetration of mobile technology reduces the information asymmetry and transaction cost that promotes the investment through the availability of various platforms (Aker & Mbiti, 2010). Nowadays, it is being supplemented by the development of global capability centers in India to promote both humans vis-à-vis the physical capital of the economy, ultimately resulting in investment enhancement. The infusion of digital means at the local level promotes the grassroots investment that helps to ripe the positive spillover of localized economic development. The microlevel digitalization reduces the transaction cost, that helps all the economic activities to get flourished. It also assists the industrial sector and MSMEs to connect global value chains, and greater prospects for investment emerge here. The introduction of AI/ML is the major determinant in the modern era. It can be related to the Austrian school of thought as it acts according to Schumpeterian creative destruction. Firms that are using AI tools for funds have a competitive advantage, and those that are not using these tools will be in disadvantage in a very short span of time (Chiruvolu & Rishah, 2023). This implies that it has unlocked the new spheres of investment and leveraged them in an efficient manner. The introduction of various AI tools will lead to heavy investment in R&D, the health sector, education, technology, real estate, crypto, digital currency, etc. and propel the self-generating investment in the economy.

Review related to Post-Keynesian School's perspective on Real Investment determinants

This school is an extension of Keynesian thought by Paul Davidson, Hyman Minsky, etc. that emphasized the inherent instability of capitalism, uncertainty, financial markets, strong emphasis on fiscal policy, etc. The financial market provides the platform for the channelization of saving and also attracts foreign investors by market operations, regulation and protecting the interest of all market participants. In short, the financial markets are the middlemen in this process of investment, and efficient markets create self-generating and stable investment in the economy. Efficient and deep financial markets will lead to effective transmission of monetary policy during the expansionary policy to promote investment (Ndikumana, 2000). In contrast with it, less developed markets create a volatile investment environment. Sophisticated financial markets lead to cheaper capital and efficient allocation of this capital. When it comes to economic outlook, investment is extremely prone to fluctuation, so economic outlook affects the investment decisions of one country to the whole world. A stable environment induces more investment and accelerates the process of income generation. While uncertainty generates the volatility in real macroeconomic variables that can lead to severe falls in investment as well and take longer period to recover (Carrière-Swallow & Céspedes, 2013). Post-Keynesian has also advocated the idea that income inequality will lead to insufficient effective demand and hence underemployment equilibrium in the economy. Underemployment equilibrium will lead to underutilized capacity, and this unutilized coupled with insufficient demand will discourage economic activity and slow down economic activities. Staggered economic activity will create an instability index to increase and disincentivize the investment prospects. On the other hand, when income distribution improves, the instability index decreases, leading to increased investment in the economy (Alesina & Roberto, 1993) as equal distribution will generate effective demand and promote stability.

Review related to Institutional School's perspective on Real Investment determinants

This school of thought has challenged the “rationality” assumption of mainstream economics and deals with the impact of social, historical, and institutional structures of the economy in determining the investment level. Resilient financial institutions are the pre-requisite for stable investment in the economy (Kim et al., 2020). The unstable markets are more prone to systemic risk and lead to financial and macroeconomic crises, such as the global financial crisis of 2009, which even breaks the relationship of low interest rates and high investments. Another example is Silicon Valley Bank collapse that has affected the venture capital and unicorn funding all over the world in March 2023. So, the policymakers must direct their effort to ensure the stability of these institutions. Another important element in this school of thought is demographic structure, sectoral composition, knowledge, etc. The economy with low dependency ratio and high demographic dividend has positive association with the level of investment. “The demographic transition towards a demographic dividend encourages the growth of savings, thus improving a country’s prospects for investment and growth (Bloom et al., 2001). On the other hand, a high dependency ratio will create an imbalance in the economic structure and a low scope of investment. The sectoral composition acts as a silent but determining factor of investment. The economies with the highest share of industrial and service sectors have more investment in the economy than the agricultural economies. The study of Africa and Latin American countries showed that investment in the economy increases if the economic structure transits from agriculture to industry, or as per Clark’s structural transition (McMillan et al., 2014). The reason being that highly industrialized economies tend to attract more investment in the economy relative to agricultural economies. Whereas, knowledge or knowledge-based economy is also a key factor for driving investment channels. It has significantly attracted FDI in India in the early 2000s, which results in the dissemination of technological development and contributes to the service sector growth. Endogenous growth has also supported this view that considers “knowledge as a public good” (Field, Romer, (Romer, 1990), and investment in knowledge will create human capital, the major growth driver in the economy. So, knowledge spurs both physical and human capital that are integral components of real investment. Infrastructure also holds exceptional significance for self-propelling investment in the economy, as there is a positive influence of the local infrastructure and human capital (Dempere et al., 2023) on investment. Rosenstein Rodan (1943) has also laid the emphasis on indivisibilities of production that aim to build infrastructure, including durability of projects, gestation period, lumpiness of capital, etc., to create external economies that promote overall growth and investment.

Review related to Ecological School’s perspective on Real Investment determinants

This branch of heterodox economics deals with the interrelationship of environment and economy, as the environment provides resources for the functioning of the economy, and economic activities have an influence on the environment. Here, climate change becomes the prominent factor in the present context that requires an appropriate physical risk assessment, developing carbon capture storage, energy efficiency technologies, etc., to combat it strategically for sustainable development. "So, internationally calibrated efforts are required to ensure the certainty of climate strategies, as uncoordinated or uncertain climate strategies can also lead to unsustainable investment” (Field, Olasehinde-Williams (Olasehinde-Williams et al., 2023). Environment also relates economic decision-making with ecological limits, that is, carrying capacity to absorb the generated waste and providing the survival of natural habitats. This ecological limit provides an overview of scarce resources and navigates investment from resource-oriented sectors to

sustainable technologies such as renewable energies, circular economies, and recycling, etc., raising ecological consideration. In this way, opportunities arising due to increasing ecological considerations raise a cost-benefit ratio that stimulates investment through project approval. (Adamowicz et al., 2019). Over the time, with the transition of economic activities, the attention has been shifted towards the research and development that requires huge investments as “it stimulate private investments and the effects vary based on experience in corporate innovation activity and the level of labor productivity from the past” (Maria et al., 2015) to cope up with the current challenges. It can be stated that ecological thought considers the current dynamics of investment determination with special reference to the environmental and economic repercussions.

The next section highlights the prominent determinants using the bibliometric analysis of the existing literature related to the evolution of the determinants of the real investment.

Table 1 Snapshot of prominent determinants of real Investment under Mainstream and Heterodox Economics

Sr. No.	Name of School	Timeline	Major Determinants of Real Investment
1.	Classical School	1776-1870s	Saving, Capital Accumulation, Profit, Labor Cost
2.	Neo-Classical School	1870s - 1930s	Interest Rate, User Cost of Capital, Depreciation, Taxation
3.	Keynesian School	1936-1970ss	Business Expectations, Marginal Efficiency of Capital (MEC), Marginal Efficiency of Investment (MEI), Multiplier, Accelerator, Super Multiplier, Fiscal policy
4.	Neo-Classical Synthesis	1940-1970	Income, Coordination of Monetary and Fiscal policy
5.	Monetarism	1950s- 1970s	Money Supply, Inflation, Q-coefficient
6.	New-Classical	1970s	Globalization, Technological Shocks, Exchange Rate, Interest rate-disparities
7.	Supply-Side School	1970s	Tax Rates, Political Stability, Regulatory Environment
8.	New-Keynesian	1980s	Imperfections in Market, Inflation, Monetary Policy
9.	Marxian		Surplus Value, Profit
10.	Austrian	1840- 1926	Innovation, Entrepreneurial Capabilities, Technological Penetration
11.	Post-Keynesian		Efficiency of Financial Markets, Economic Outlook, Income Distribution
12.	Institutional	1919 onwards	Demographic Structure, Sectoral Composition, Infrastructure, Knowledge, Resilience of Financial Institutes
13.	Ecological School		Climate Change Strategies, Ecological Considerations, R&D

On the basis of the above analysis, it can be summarized that under the Mainstream Economics, classical school focused on fundamental factors like profit, cost of labor saving and capital accumulation as determinants of real investment. The neo-classical and Keynesian focused on technical and psychological factors like expectations. The later schools emphasized on globalization, technological change and market factors as determinants of real investment. On the

other side under Heterodox economics, Marxian school like classicals of mainstream economics focused on surplus value and profit. Other schools under heterodox economics include innovation, technology, financial market efficiency, income distribution, demographic structure, infrastructure, climate change and ecological considerations as determinants of real investment. Therefore, on the one side mainstream economics supports market mechanism, innovation, profits, productivity as factor influencing industrialization and, on another side, heterodox economics provides the theoretical foundation for rethinking of industrial progress with human-centered technology, resilient supply chain investment, climate resilience and green financing as determinants of real investment. Eventually, it emphasizes the relevance of these new investment determinants in shaping future economic policies to achieve SDGs targets and Industry 5.0 transitions.

Concluding Remarks

This research article concludes that in this age of industrial revolution 4.0, undoubtedly the importance of heterodox determinants has increased. However, it does not imply the weakened significance of mainstream determinants, as labor productivity, gross fiscal deficit, market size, etc. are the major determinants of private investment in India (Mallick, 2013). So, this implies that the determinants of both branches are complementary in nature when all the economies are preparing themselves to enter into the era of Industrial Revolution 5.0. This new age of industrial revolution 5.0 will blend AI (artificial intelligence), human capital, and physical capital that upholds the relevance of both branches in real investment determination. Together, both branches include all micro, macro, structural, technological, and global aspects of determinants that play a significant role in influencing the real investment scenario. These factors have a reinforcing effect on each other. As micro factors of mainstream economics along with financial factors of heterodox are more prone to short-term fluctuations, they can lead to systemic risk that influences real variables of the economy, such as investment, output, etc., adversely. So, to avoid the occurrence of systemic risk, the policymakers should focus on this set of factors for the timely intervention. These interventions can come in the form of ensuring an efficient financial market, managing credit levels, appropriate monetary policy, etc. The analysis of both branches emphasizes the maintenance of resilient macroeconomic fundamentals that form the business expectation in the economy and directly impact the investors' confidence domestically as well as externally. The higher the confidence, the higher the real investment in the economy, and vice versa. The article also stresses the utilization of skilled human capital, knowledge-based economic factors, and demographic dividend, along with the removal of structural bottlenecks and unequal distribution of income which impede the growth process. It supports the efficient allocation of resources through policy coordination to leverage positive spillover and makes the investment and output self-generating. Investment has an inherent volatility due to the high interconnectedness of domestic and external factors as explained by the Mundell-Fleming model of open economy in mainstream economics. This requires coordinating international policies, innovation-driven measures, developing digital infrastructure, etc., to reduce the volatility of real investment that comes under the ambit of heterodox economics. So, the article concludes that the determinants of both mainstream and heterodox from the earliest to the latest school of thought have a profound impact on real investment. This article insinuates an eclectic framework that focuses on technology adoption, developing sustainable digital infrastructure, expenditure on R&D, incorporating artificial intelligence, consideration of assimilative capacity, and developing green technologies, etc., to support the optimum level of real investment in the economy.

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