

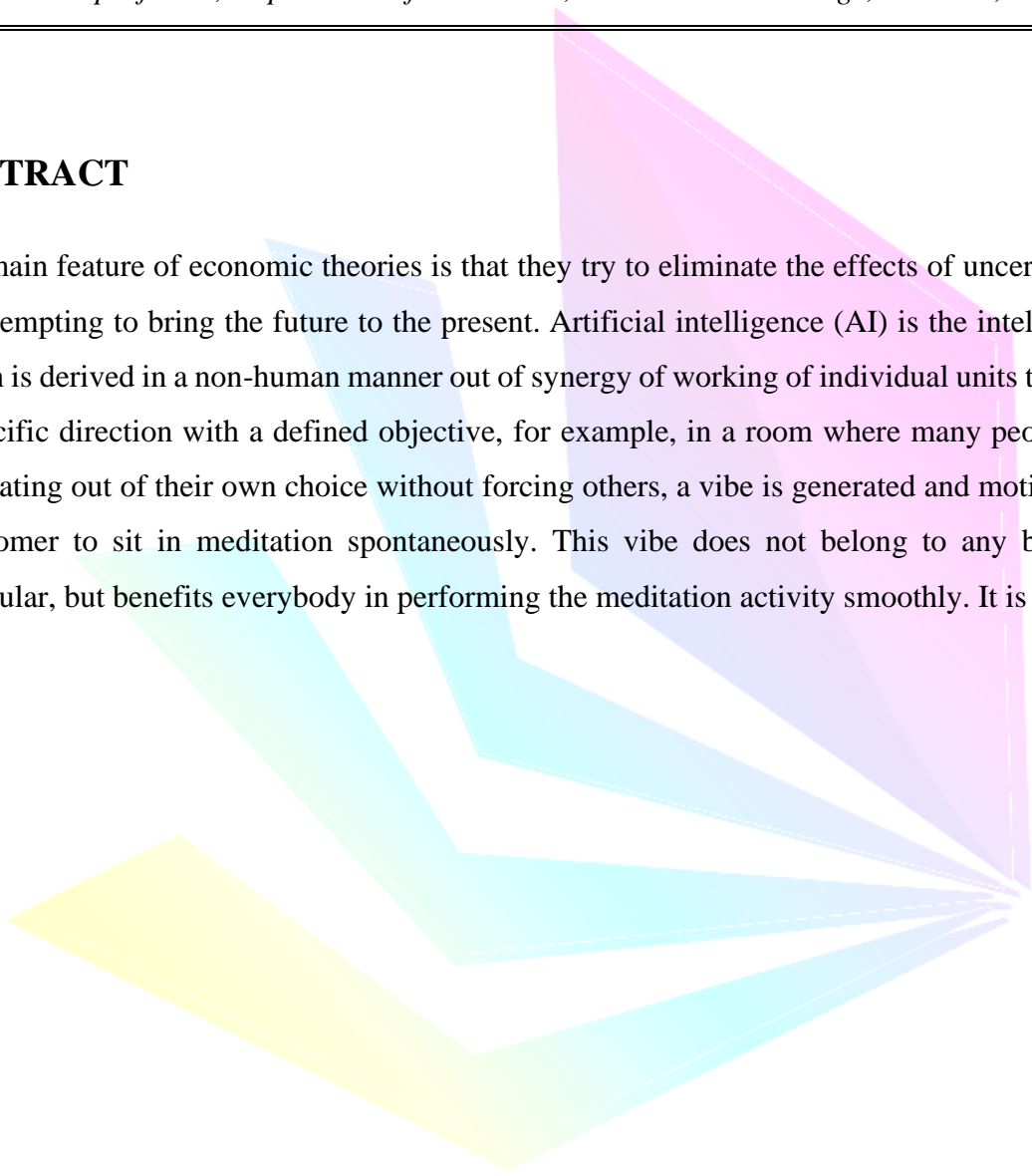
ARTIFICIAL INTELLIGENCE IN ECONOMICS

By Dr. L. Johncy

Assistant professor, Department of Economics, The American College, Madurai, India

ABSTRACT

The main feature of economic theories is that they try to eliminate the effects of uncertainties by attempting to bring the future to the present. Artificial intelligence (AI) is the intelligence which is derived in a non-human manner out of synergy of working of individual units towards a specific direction with a defined objective, for example, in a room where many people are meditating out of their own choice without forcing others, a vibe is generated and motivates a newcomer to sit in meditation spontaneously. This vibe does not belong to any body in particular, but benefits everybody in performing the meditation activity smoothly. It is AI.



ARTIFICIAL INTELLIGENCE IN PRICE FIXING IN REAL SECTOR

The determination of selling price in a market where innumerable transactions are happening with respect to a particular product be it a potato in the vegetable market or a share of some company in a stock exchange is an AI process. A process similar to the auctioning in the vegetable markets in India in the early morning is codified in the software programmes and is run on the trading platform of the exchange houses to track the tatonnement of bids and offers over a scrip.

Earlier, Amazon India had planned to use advanced Computer Vision, ML and AI technologies to manage the quality assurance of fruits, vegetables and other farm produce. For example, the model could recognize defects such as cuts and scratches on tomatoes and onions when they have gone wrong.

The system used a mix of CNN and ViT algorithms. Computer Vision was used to detect cuts, cracks, pressure damage and more. The tech had deployed tomatoes and onions in Amazon stores in India and Europe. They planned to enhance the model to grade the product moving on a conveyor belt automatically.

In an Interview, Rajeev Rastogi, Vice president of ML at Amazon India, Said the Company has developed Computer Vision programs that recognize defects such as cuts and Scratches on tomatoes and Onions out when they have gone bad.

The New Zealand Commerce Act 1986 (**Commerce Act**) prohibits anti-competitive cartel agreements between competitors, such as price fixing agreements. But what happens when businesses use AI technologies that use algorithms that have not been trained to notice, and avoid, anti-competitive cartel behaviour? There is a risk that, as businesses increasingly move towards using AI-based algorithms to set their prices, algorithms could make it easier for competitors to achieve and sustain collusion without any formal agreement or human interaction.

Problematic conduct involving AI-based pricing algorithms could include two or more humans agreeing to fix prices, but rather than agreeing an explicit price, they agree to implement a joint pricing algorithm that coordinates prices on their behalf (i.e. human-to-human collusion on the selection of the algorithm)⁽²⁾.

Companies have already been prosecuted for such conduct in Europe, including in respect of an agreement to reconfigure automated pricing software so as not to undercut each other; and for agreeing to implement an algorithm to allocate customers between each other. This does not differ substantially from traditional price fixing – it is still a cartel agreement between two people and is prohibited conduct under the Commerce Act. The only difference is how the agreement is implemented (i.e. using a common AI algorithm).

BENEFITS OF AI-BASED DYNAMIC PRICING ON AMAZON

The latest generation of repricing tools relies on artificial intelligence. Machine learning algorithms draw on historical sales and product data, as well as external data sources. They consider a much larger number of pricing factors when calculating optimal prices and they also (semi-) automatically learn from market feedback, adjusting their output to help users achieve higher profits every time.

Especially private label distributors, who do not compete exclusively on price, must be able to determine whether a particular factor will improve or reduce their target groups willingness to buy from them. AI-based tools can detect complex patterns that are difficult to identify manually, helping users improve their profit margins more effectively than traditional repricing tools.

The most advanced AI-based dynamic pricing method for Amazon is predictive pricing. It is based on machine learning pricing, but also incorporates powerful forecasting and optimization algorithms.

The benefits:

- Accomplish sales or profit targets on autopilot

- Accurate sales and profit forecasts
- Holistic recommendations for price optimization, taking into account the full spectrum of pricing factors

AT A GLANCE: THE ADVANTAGES OF PREDICTIVE PRICING

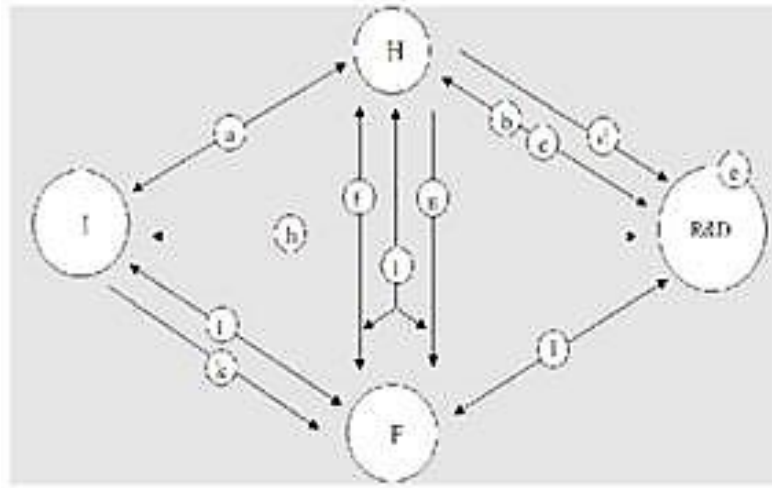
- | | |
|---|---|
| <p><input checked="" type="checkbox"/> Higher profitability
Up to 10% higher profits compared to a rule based approach.
Proven in A/B tests with clients.</p> | <p><input checked="" type="checkbox"/> Intuitive steering based on targets
Prices are optimized towards set targets. Price for whole assortment can be optimized in one run.</p> |
| <p><input checked="" type="checkbox"/> Less manual work
Effort to administer and implement price rules will be drastically reduced</p> | <p><input checked="" type="checkbox"/> Forecasting function included
Software calculates sales, revenue and profit scenario for price recommendation.</p> |
| <p><input checked="" type="checkbox"/> Holistic optimization
Considers all relevant input factors (e.g. stock, competitor price).
Best approach for products sold exclusively.</p> | <p><input checked="" type="checkbox"/> Continuous improvement
Software detects changes in performance and changes price recommendations accordingly.</p> |

AI in General Equilibrium

The earlier circular reference function in the spreadsheet helping simultaneous determination of output and interest rate together in real and monetary sectors has grown into the AI process where it is possible to determine volume and prices not only in all output markets but also at the same time in all input markets delivering a general equilibrium at a much-reduced time frame.

The economy has two production Sectors, Final output and intermediate goods, and one R&D Sector for AI Technology. We consider three types of data: raw data, production data,

technology data. It is important to note that that we assume raw data is non-rival and both production and technology data are generated by using raw data and Labour. There is no population growth and time is Continuous. (see figure 1)



Note:

- 1) H, I, F represent Household, Intermediate good producer, Final output producer, respectively.
- 2) (a) H provides physical assets and receives returns.
- (b) H provides physical assets and receives returns.
- (c) H supplies labour to produce technology data and receives wages.
- (d) Raw data is used in the R&D sector.
- (e) AI technology, including machine learning and deep learning, also referred to as Invention of Method of Inventing (IMI)
- (f) F sells final goods or services and receives payment.
- (g) Raw data is used in final output sector.
- (h) Blueprint, recipe, idea
- (i) H supplies labour for production and for generating production data and receives wages.
- (j) I supplies labour for production and for generating production data and receives wages.
- (k) Variety, expansion
- (l) Learning-by-doing

AI in Financial Sector

In financial economics there is widespread use of AI in making decisions of trading in financial securities like stocks and bonds based on prediction of their prices and also in making decisions of entering interest rate derivative contracts with speculative or hedging motives based on prediction of benchmark interest rates like LIBOR (short term) and 10-year government security yield (long term). Algorithmic trading, automated trading etc are now common vocabularies in financial literature. The most spectacular contribution of AI is toward indicating a tail loss in the value at risk that was not available before the subprime crisis. That way AI can be useful in preventing systemic crisis.

AI has the potential to transform the Financial Services industry can help improve efficiency for the better. It Cut Costs, and make processes easier for customers and employees. From Chatbots and digital assistants to fraud detection and risk management, AI is Streamlining Various processes and making them more efficient.

- 1) **Fraud detection:** AI can help financial institutions detect fraud by analysing patterns in Customer data. By looking for anomalies like account activity, transaction history, and even Social Media activity, AI can Flag potentially fraudulent activity for improved investigation.
- 2) **Personalized Customer Service:** AI Provides more personalized customer service. By understanding a Customers individual needs and preferences, AI -powered chatbots and Virtual assistants Can provide a more tailored Customer experience.
- 3) **Claims Processing:** AI Streamlines the process by automatically verifying information and routing claims to the correct department.
- 4) **Marketing:** AI targets Customers with personalized offer and advertisement.
- 5) **Portfolio management:** AI helps investment managers decide where to allocate Capital.
- 6) **Risk Management:** AI can assist financial institutions in managing risk by identifying trends and patterns in data that humans might miss, Using historical data and machine learning, AI can help predict future rises to mitigate them.

- 7) **Regulatory Compliance:** AI can be used to help financial institutions comply with regulations Such as know-you- Customer (kyc) and Anti-Money Laundering (AML) Rules.

Despite its potential, AI adoption in financial Services has been slow due to Various Challenges, including data quality issues and a lack of understanding of how AI drives business value.

However, things are starting to Change. Several financial institutions are beginning to experiment with AI and there are signs that AI adoption will increase in the Coming years⁽³⁾.

AI Finance tools

1. Alphasense
1. Greip
2. Chain GPT
3. Receipt Cat
4. Not reload
5. Tim works
6. Zerotax
7. Finalle.
8. Glean AI
9. True wind.

AI to prevent Loan Default

Application of big data to the details of loan defaulters of the all the banks and application of AI in detection of Moral hazard underlying Certain lending borrowing decisions. Can provide an earlier Signal about a prospective default.

Above all are about use of AI relating to Profit-making decisions or utility maximizing decision generally in the arena of micro Economics, Financial Economics, industrial Economies and game theory.

In the world of lending and financial management, understanding Credit delinquency is crucial. Delinquency Strings, which represent a borrower's payment history Overtime, can provide valuable insights into credit risk. Moreover, with the power of AI, it's possible to predict future potential defaults and proactively Flag accounts at risk. In this blog we'll explore the concept of Credit delinquency, share example, and delve into how AI can be a game changer in preventing defaults.

- **Understanding Credit Delinquency:**

A delinquency String is a numeric representation of a borrower's payment history, typically over Several Months. Each number Corresponds to a specific month, indicating whether a payment was made or missed during that period. For example, "111234353" means payments were missed in the 2nd, 4th, 5th, 6th and 7th months.

- **The Risk of Default:**

Delinquency Strings matter because they directly impact the risk of default. When higher numbers appear, they signify missed payments (or) delays in payment, raising the probability of default. Here are Some examples:

Example 1: A delinquency String of "111234353" Suggests Consistent missed payments, indicating a high risk of default.

Example 2: A String like "714250000" indicates inconsistent payments and also Signifies a high default risk.

Example 3: "416426000" Showcases some missed payments but is not as Consistent, leading to a default risk moderate default risk.

Example 4: A String such as "000056125" starts with missed payments in later months, indicating an increasing default risk.

AI - Powered Solutions

Nao, Let's talk about how AI can be a powerful tool to prevent defaults.

1. Predicting Default Risk: AI algorithms can analyse delinquency Strings and historical data to predict future default risk. By identifying patterns in payment history, AI can highlight accounts likely to face default in the future.

2. Early Warning Systems: AI can also be used to Create early warning systems. For example, if a borrower's delinquency String begins to show a pattern of Consistent missed payments, AI can Flag the account as high risk, allowing lenders to take proactive measures.

3. Personalized Financial Advice: AI- driven chatbots can offer personalized financial advice to borrowers in real-time. If an account is at risk, these AI systems can provide Suggestions on how to improve their financial Situation, potentially preventing default.

4. Automating Collections: AI can Streamline the Collections process by prioritizing accounts based on their likelihood of default. It can determine the best Communication methods and times to Contact borrowers, increasing the chances of recovering payments ⁽⁴⁾

Socio - Economic Applications of AI: Relating to macro Economics and development Economics, big data, data Science and AI can be Useful, e.g. in predicting (i) the number of migrant Labours between two regions in Urban economics (ii) the interest losses to governments and the corresponding Volumes of Funds returned by the target users in Public Finance (iii) the volumes of unaccounted transactions in the informal Sector and the Concerned behaviour of the economic agents involved in those transactions in Indian Economy (iv) loss of incomes of farmers disconnected from the electronic national agricultural market (ENAM) in agricultural Economics (v) inflation and unemployment in macro Economics and so on.

UNBRIDLED FREE MARKET GROWTH

Without Strict regulations, artificial intelligence will grow to be the dominant choice for any knowledge based industry, simply because of profitability. Once built, AI is Orders of Magnitude Less expensive to implement, better than human intelligence, and Capable of running 24/7 Cohere as humans still need to eat, sleep, and kill time around the water Cooler.

Over the next ten years, really every knowledge based company on Earth - including Software development firm, creative agencies, Publishing houses and media Conglomerates will shift to producing most of their output with the help of AI.

Mass Employment:

By 2040, a large chunk of western white Collar workers, who have long held themselves in high esteem because of their intelligence and technological acumen will be out of work. They'll be forced to look for lower-paid, manual labour positions that have get to be automated like logistically Complex Construction Jobs.

The growing number of "unskilled" workers will lead to lower Compensation, Significantly increasing the wealth devices. This will lead to Social and public unrest, pressuring world governments to regulate the use of artificial intelligence as unemployment rates Soar. Democracies all over the world will look for "quick fixes", in elections of Strong-armed, populist Leaders will result.

AI for Economic Research:

Theorizing economic behaviour is a major part of economic Research. The process of Collection of data on economic behaviour has been evolving toward being more and more automated Since the ICT (Information Communication and Technology) revolution. Over last two decades in India the researchers have been finding their hard discs deluged with big data Collected through internet portals and electronic payments. Analysis and interpretation of these data using AI ushered in a new age of economic research.

CONCLUSION

Firms will experiment to discover how to Create value From AI. Some of these experiments will fail or prove that the adoption of AI is uneconomical. Some firms will learn from these failures and others will try again. Skills shortages, tighter regulation and consumer fears will

slow down the adoption of some AI Systems and Favour others. The adoption of AI in an industry or firm will create sub industries intent on manipulating it and lead to unexpected outcomes, and new changes in response.

In other words, the future of AI in the economy will resemble the Internet more in the than Skynet: It will be complicated. Prediction machines not only increase the amount of decisions We are able to make based on AI recommendations, but also the amount of decisions that we need to make as participants in the economy and as a society about what AI technologies to develop where to adopt them and how to manage their impacts. As the timely discussions in the latest Economics of AI Conference Showed some of the best economists in the world are working hard to generate theories and evidence to inform these decisions.

