

## **TQO Algorithm Based Dynamic Pricing**

Dynamic pricing is a practice of pricing wherein prices are adjusted rapidly and frequently in response to demand - is commonly used in a range of sectors across the economy including air travel, hotels, and ride hailing apps. As technologies, such as AI, develop so too does the potential for pricing practices like dynamic pricing to become increasingly prevalent and complex. As both the use of large language models and the use of e-commerce become more and more common parts of business practise dynamic pricing has gotten exponentially easier in a very brief space of time.

There are numerous models of algorithm based dynamic pricing, and the practice is seeing an undeniable increase in popularity, in both the theories and practices of retailers. These include everything from having consumers answer a question about their expectations of price in a manner in line with more standard forms of market research to having a large language model examine a myriad of data points from across numerous categories (including competitors' prices, seasonality and market uncertainty) to calculate an optimal price of sale. Another common modus operandi of the algorithms is a rules-based algorithm which operates on predetermined directives (such as raising prices by a set percentage whenever demand reaches a set amount) or ones that learn via trial and error, so testing various prices and learning of results to maximise both amounts sold and profit made.

Dynamic pricing as a method for setting prices has been a controversial practice since more or less its conception. In 2013 during a snowstorm in New York on New Year's Eve Uber sparked public backlash as prices were seen to rise to eight times their normal amount. During the Covid-19 pandemic Amazon was accused of price-gouging after items that were suddenly in high demand also increased drastically in price. Most notably and more recently tickets for the Oasis Live '25 Reunion Tour were strongly affected by dynamic pricing though Ticketmaster claimed in response to allegations that this was simply differing prices for differing tiers of seating and attendance, a further recent example of dynamic pricing in music could also be seen during the recent tours of both Bruce Springsteen (for whom tickets rose to \$4000 to \$5000) and Blink-182 (where tickets reached up to \$600).

There have also been various ways in which the practice has gone on without much if any complaint from consumers, for example Google Ads and Airbnb, both of which utilize algorithms drawing from several data sets to find an optimal price, designed to sell the most products while maximising the profit made from each individual product. Of course, as the earliest adopters of dynamic pricing airlines also ought to be mentioned as they introduced the idea to the greater market with such ideas as different ticket prices during different times of year and offering lower prices for earlier bookings.

It should be noted by delegates that dynamic pricing is neither necessarily illegal nor is it always to the detriment of the consumer. It is in all a vacuum perhaps the most economic method of pricing a product as it is essentially taking the ideas of supply and demand to their logical conclusion on a microeconomic scale. Dynamic pricing operated by adjusting the price of a product depending on how high the demand for that product is, for example in the aforementioned case regarding Amazon the sudden increase in demand for products including inter alia, hand sanitiser and face masks led to the prices of these products sharply rising as there was little demand for them prior. This is however from a purely economic sense merely an example of a shifting of the supply-demand equilibrium as due to the logistics of manufacturing only a limited number of such products could be produced at a time, and though production was being increased to meet demand such a change did not happen immediately, so for a short time, the goods in question were commodities and therefore more expensive. Hence, as stated in many cases dynamic pricing is oftentimes just the concept of supply-demand equilibrium taken to an extreme and often unpopular end.

The algorithms involved are also often capable of adapting to market trends and reacting to shifts in consumer activity faster than their human counterparts, this allows companies to maximise profitability by increasing prices when demand is high and thereby reducing demand to manageable levels, or reducing prices when demand is low to invigorate the market for a given product.(at least in theory, though this does not always work in practice).

That is not however to say that dynamic pricing is without issues. As noted by the United Kingdom Competition and Markets Authority (C.M.A.) one key issue commonly found when dynamic pricing is seen is the lack of clarity to consumers of how prices are being adjusted, for as the same report notes, many companies engaged in dynamic

pricing do not actively inform their customers of this fact. This can lead to both a negative public appearance for the corporations involved in dynamic pricing as well as risking the taking of reckless actions such as impulse buying on the part of the consumer as they may simply assume that as prices are rising now they may continue to do so, leading them to purchase in haste and as a result possibly bring true their fear as the increasing demand by consumers will again shift supply-demand equilibrium and thus cause the price of the product to rise yet again. The hypothetical situation that has just been described is very much a reality as a result of the lack of clarity about dynamic pricing practices and so delegates would be strongly advised to examine information as a key aspect of preventing this, as the harm done by dynamic pricing can be largely attributed to the the role of asymmetric possession of information between merchants and consumers and thus the link between scarcity of information to consumers and harm done to consumers cannot be overstated. This point is especially salient when algorithms are involved in adjusting prices as while alterations enacted by humans can be cryptic and difficult for consumers to fully comprehend it is safe too say that oftentimes the methods of algorithms, particularly if they involve the use of large language models can be doubly as alien to the comprehension of customers. Finally, delegates are directed to note that while dynamic pricing is not (at time of writing) illegal, however in many cases failing to provide adequate information or even providing misleading information to consumers is.

As a result of the way algorithms are structured some may end up offering different consumers the same products at differing prices, this kind of personalisation can lead to price discrimination as some demographics or individuals may be charged higher prices for the same product as other consumers, this fear is not without precedent as in the year 2000 Amazon faced public backlash as its algorithms did just that, though this was reportedly due to a software error. This issue also brings to light issues of consumer data and privacy concerns as some practises may violate national or regional guidelines on data protection and are part of the larger market for consumer information, which is in itself a matter of great concern.

There are numerous issues with algorithm based dynamic pricing, and hence there are many avenues to amending these issues that delegates may wish to pursue. As this topic, by its very nature imposes on several other, wider topics collaboration with other groups, from United Nations bodies to N.G.O., think tanks, member states and of course the companies implementing the problematic methods.

Guidelines and frameworks will in all probability be the primary tools of resolutions on this issue, on both the algorithms themselves (from decisions on the level of data that they are allowed to consume about consumers to the levels of human oversight that ought to be employed).

This topic has only existed for the last twenty-five years and only come into true prominence in the last two or three and thus delegates would strongly be encouraged to call for research from all sources as well as public information campaigns to educate the public (the latter perhaps most of all when one considers the role of asymmetric access to information in creating the primary problems surrounding this topic).

## **TQO Cross Border Shadow Banking**

Shadow banking is a term used to describe bank-like activities (mainly lending) that take place outside the traditional banking sector. The key difference between shadow banking and standard banking is the significantly lesser amount of regulation on the part of the former. Shadow banking is of a decentralized nature. It should be noted that despite the implications of the term shadow banking and the lack of regulatory oversight that shadow banking is in fact a fully legitimate activity and is in fact a cornerstone of internationally connected economies with the Financial Stability Board estimating that 25% of financial system assets being part of the shadow banking

system; there are however, marked differences in the definition of shadow banking across various jurisdictions. Nonetheless the topic of cross border shadow banking is both complex as well as vital to financial forethought in the 21st century.

Shadow banking takes a diverse range of forms and typically includes a range of entities (such as hedge funds and money market funds) and activities (like securitisation and repo markets). Due to a relative lack of regulation when compared to organisations engaged in standard forms of banking, shadow banking organisations tend to have a far easier time operating at an international level. As a result of this relative freedom, they are both a leading asset to globalisation and interconnectivity as well as a significant risk during financial crises as a result of their ability to transfer the effects of a crisis from one market to another. For this reason, it is generally accepted that cross border shadow banking exacerbated the effects of the 2008 financial crash. It has also been found that in recent years the shadow banking and banking system have become steadily more interconnected.

The 2008 financial crisis highlighted the great potential dangers of reliance on shadow banking as it served as a contagion pathway for the shocks taken by the American economy to be transferred to the international economy, hence allowing a crisis that began in the United States to crash the European and especially the Irish economies.

Since the 2008 financial crisis the presence of non-bank financial intermediation entities has grown relative to commercial banks. Commercial banks have also become more connected with shadow banking, European banks for example were found to have exposed about 4.3% of European G.D.P. in shadow banking organisations or about €559 billion, of that approximately 60% of this investment was towards organisations outside of the European Union with a particular concentration of 27% in the U.S.A.; by 2018 shadow banking made up €34.5 trillion or about 40% of financial sector assets.

It should be noted that the E.U. is generally held to have comparatively strict regulations on shadow banking, despite this the European Central Bank continues to rely heavily on private agents in the regulation of shadow banking.

Of the numerous risks posed by international shadow banking is the lack of regulation. This is caused by several factors, the most prevalent of which are a lack of internationally utilised frameworks and regulations on the sector, which is a significant aspect as to the popularity of shadow banking for operations between multiple nations. This lack in effective legislation could also be attributed to the relative novelty of the technologies often involved, as with the rise of electronic banking and cryptocurrencies movement of substantial amounts of capital between nations had become increasing easy. This level of innovation over the past decade is partially responsible for the growth of shadow banking and the lack of haste displayed by legislators in reacting to the change in methods of banking and finance have been partially responsible for the unregulated state that it finds itself in.

The second largest issue with regulating shadow banks is the gap in data, with shadow banking only coming to the forefront of financial thought after its role in the 2008 financial crash comparatively little research has been done on it. This gap in information is being closed as research in the area increases, though a gap in knowledge is still undeniable.

There are numerous other risks associated with cross border shadow banking, among these are:

The risk of transmission: of crises, the naturally non-transparent state of both organisations and infrastructure. As previously stated, this allows for the issues faced by financial institutions in one nation and the shocks faced by that economy to be rapidly spread internationally leading to the potential for a global chain reaction,

The inherently non-transparent aspect of both the organisations involved, for example as stated prior electronic banking is key aspect to the functionality of international financial connectivity, these are often poorly regulated; further shadow banking as whole tends to be loosely regulated, may acting without mandatory disclosures, leading to a continuation of the pre-existing trend of insubstantial regulation and legislation. The lack of actual regulation and anything more than the most tokenistic of enforcement has also led to the shadow banking system being the method of choice for money laundering as the system is not beholden to any authority any entity acting with the required skills can do as they please assuming they aren't being openly flagrant in their breach of law.

Shadow banking can also accelerate macro-economic cycles. As a result of being able to move funds so easily over national borders shadow banks can rapidly move investments to countries enjoying economic peaks as well as efficiently move liquid fund out of nations that are beginning to experience downturn, thus hastening and worsening an economic contraction.

Bodies such as the European Systemic Risk Board (E.S.R.B.) have begun to acknowledge the issue presented by shadow banking and thus have begun analysis of its impacts on the nations within the European Union economic bloc. The European Banking Authority (E.B.A.) published a framework in 2022 for identifying shadow banking organisations. The F.S.B. has also published a report detailing their regulatory proposals for the shadow banking system.

Most proposals for the regulation of the shadow banking systems place great emphasis on multinational cooperation between nations as shadow banking an international issue.

### **TQO Disability Related Poverty**

The United Nations Convention on the Rights of Persons with Disabilities defines person with a disability to include “persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.”

According to the World Bank 16% of the global population is disabled while 2 to 4% suffer significant functional difficulties. And there are numerous why they are more prone to poverty and its various adverse effects. Those affected by disabilities tend to earn lower wages and reduced employment prospects while also having a higher cost of living. Indeed, the United Nations flagship Report on Disability and Development 2024 notes how outside of some categories (primarily special education laws and equality laws) of the Sustainable Development Goals (S.D.G.s) people with disabilities are very much getting left behind by very visible margins. This is compounded by the fact that according to Inclusion Europe persons living in poverty are more likely to develop disabilities due to malnutrition, inadequate access to education and health care, unsafe working conditions, a polluted

environment, and lack of access to safe water and sanitation and that people with disabilities are more likely to find themselves in poverty.

The links between disability and poverty are manifold and oftentimes systemic to an economy, requiring profound change and effort on the part of member nations to address. A particularly notable example of this in Europe, held to be part of the highly developed Economic North and in theory supposed to be one of the best places for equality, however Inclusion Europe notes how “income related schemes for persons with intellectual disabilities are inadequate to meet their actual needs” and that as a result many disabled people become a financial burden to their families. This issue is worsened as family members may choose to stay home and care for their relatives (instead of paying for potentially extremely costly care) and thus serving to further reduce the amount of income that the family receives. Many people with both intellectual and physical disabilities also encounter difficulty attending and experience mainstream education, based on things such as physical access, increased costs of schools able to accommodate their disabilities stigma emerging from their educators or peers and any number of other reasons. All of these factors can contribute towards placing people with disabilities and their families in poverty.

Special attention ought to be paid to less economically developed countries (L.E.D.C.s) as the UNICEF Global Disability Inclusion Report notes that that “In many low- and middle-income countries, disability-related public spending remains marginal, and disability inclusion rarely features in national development and financing strategies”. The report further notes that only 0.1 to 0.5% of national Gross Domestic Product (G.D.P.) is spent on social support for disabled people, which when compared to members of the Organisation for Economic Co-operation and Development, which are generally understood to be very economically developed spend up to 1.5% of national G.D.P. solely on supporting people with disabilities, while still experiencing not inconsequential problems despite their significantly higher spending.

The efforts of member nations may also be hindered by a lack of coordination among ministries and departments within that nation’s government, the responsibilities of both health and social protection departments may both be seen to include the support of people with disabilities, meaning that without clarification projects may simply be left undone by departments that don’t know what they’re supposed to be doing.

As has been stated prior education plays a key role in enabling people in general to rise out of poverty and is thus essential to the solving of this issue. There are of course numerous difficulties faced by disabled people when accessing education, primarily of course they face stigma but also for some with more extreme disabilities they may also face high fees to schools with the facilities to educate them. Laws regarding equality of education for people with disabilities are in place in numerous member nations, however such programs are both costly and logistically challenging to implement and thus while in theory most nations have equality in their education systems in practise the case is often quite the opposite.

Perhaps the other largest aspect of solving the issue of disability related poverty is through employment, as it goes without saying that the ability to earn money and thus to live without dependency on either the state or an individual is vital towards tackling the issue in question. Numerous barriers are faced by people with disabilities when seeking employment. To name but a few: discriminatory hiring practises, inaccessible workplaces, inaccessible transport, a lack of accommodations that are both accessible and within a reasonable distance to their place of work if in person attendance to the job is required and a lack of opportunities to work from home.

Most of the issues listed should be solved by examining and amending where possible the systemic issues within that have created and perpetuated the inequalities. Due to the inherent diversity of each nations individual systems solutions should rely heavily on collaboration with experts and persons already embedded within said systems in order to avoid a one size fits all approach that will more than likely only worsen the issue. As many of the issues listed above are in some way related to government activity funding should be a significant consideration for while specific statistics may be more accessible for more economically developed countries L.E.D.Cs face these problems on a larger scale, if for no other reasons than more of there populations are in poverty, disabled or otherwise and that they have less money with which to fund comprehensive social programs.