

# HIGH FREQUENCY TRADING: FACT AND FICTION

Should HFT be hit with a Financial Transaction Tax?

**H**igh frequency trading (HFT) accounts for a growing share of total market turnover in a wide-range of financial markets, including those in Australia. This growth has been accompanied by concerns about the implications of HFT for the quality of financial markets.

These concerns are not well founded. The publication of Michael Lewis's *Flash Boys*<sup>1</sup> and a related story on the US CBS Television program *60 Minutes*<sup>2</sup> in 2014 promoted a number of misconceptions about high frequency trading on the part of the public, as well as some financial market participants.<sup>3</sup> In particular, it has been suggested that HFT imposes costs on investors when the available evidence overwhelmingly supports the conclusion that HFT yields net benefits.

These misunderstandings can lead to inappropriate regulatory and other public policy proposals aimed at curbing or eliminating HFT. In particular, some politicians and interest groups in Australia and overseas have suggested that HFT should be made the subject of a financial transaction tax (FTT) designed to eliminate HFT from the market, raise additional tax revenue, or reduce turnover in financial markets.<sup>4</sup> These proposals have the potential to damage financial markets and impose additional costs on investors.

This paper explains the role of high frequency trading in financial markets and considers its costs and benefits. It also considers the implications of financial transaction taxes for financial market efficiency and investors. Empirical studies overwhelmingly conclude that HFT lowers transaction costs and improves the quality of financial markets.

It is important that the discussion of HFT and any regulatory responses are well-informed and evidence-based.

## What is high frequency trading?

Automated or algorithmic trading (AT) is the use of computer programs to identify and execute trading strategies. High frequency trading (HFT) is a type of algorithmic trading that is characterised by the high velocity of trading activity.

HFT is a technology for trading rather than a trading strategy. HFT is used to implement a wide-range of traditional trading strategies on the part of a diverse range of market participants, including market making. The main difference is the speed, efficiency and lower costs associated with the use of HFT compared to other technologies and manual trading.

Many of the trading strategies implemented by HFT seek to exploit short-lived trading opportunities in markets that would not be identifiable or actionable other than by the high-speed processing power of computers. These trading opportunities are typically small price anomalies that return only a small profit (as little as one-tenth of a cent) per security traded. HFT firms typically trade in large



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volumes to generate profits from these small pricing anomalies. In doing so, they provide liquidity and help ensure the efficiency of prices for financial assets.<sup>5</sup>

Because these trading opportunities are short-lived, HFT is characterised by very short holding times for the securities traded. For example, the average holding time in the Australian equity markets on the part of HFT firms is around an hour,<sup>6</sup> but could be as short as seconds or even milliseconds.

High frequency trading is also characterised by high order-to-trade ratios. HFT firms will often amend or cancel orders many times before an actual trade takes place. This is a function of the high velocity of HFT activity. In the Australian equity market, HFT order-to-trade ratios have averaged around 13:1, although ratios of as much as 1000:1 have been seen.<sup>7</sup>

### Who are high frequency traders?

HFT is typically, but not exclusively, undertaken by small firms that specialise in the application of computer technology to financial markets and typically trade on their own account with their own capital. These firms are sometimes called principal trading firms (PTFs) because they are engaged in principal rather agency trading or broking. Many HFT firms act as traditional market makers, offering to buy and sell in the same market and profiting from buy-sell spreads, while also having the effect of narrowing those spreads. Other HFT firms engage in cross-market and statistical arbitrage trading strategies, exploiting predictable relationships between different financial instruments or markets.

The technologies associated with HFT are also widely employed by other market participants. Large financial institutions, broker-dealers and fund managers frequently employ trade execution algorithms, either as part of their proprietary trading activities or as a means of reducing the cost of trading. Trade execution algorithms are used to identify the best time, venue and order size to execute a trade. By breaking up large orders into a larger number of smaller trades, these algorithms can reduce the price impact and cost of executing a large trade, with benefits for both intermediaries and investors.

### How important is high-frequency trading?

HFT as a share of total traded volume varies between different markets in different jurisdictions. In Australia, HFT accounts for around 27% of total equity market turnover and around 14% of turnover in Australian Government Bond futures.<sup>8</sup> In some overseas markets, such as US equity markets, HFT can account for more than half of total market turnover. Automated trading accounts for half the trading activity in on-the-run US Treasury securities on the major inter-dealer platforms and around 70% of trading volume in the three major currency pairs in the foreign exchange market.<sup>9</sup> The HFT share of overall market turnover serves as one measure of the contribution of HFT to market liquidity.

Regulatory changes since the financial crisis of 2008 have reduced the market making activities of traditional market participants such as banks. Globally, banks' holdings of financial assets have declined around 40% since the crisis, largely in response to regulation.<sup>10</sup> This reduction in inventories of financial securities available for market making activities by major banks has made the market making function of PTFs using HFT even more important to the provision of overall market liquidity.

The technologies associated with HFT are also widely employed by other market participants.

### What are the benefits of HFT?

#### Lower Costs

Technological innovation, together with financial deregulation, has led to a long-term decline in trading costs in many financial markets and these benefits have been shared by both financial intermediaries and consumers of financial services.<sup>11</sup> The benefits of automation are not confined to trade execution. Back-office functions and post-trade services such as clearing and settlement have also benefited from automation.

The ability to submit orders electronically to exchanges directly rather than through brokers has been an important innovation in lowering the cost of trading.

In the US, equity market quality and liquidity have improved alongside the rise of electronic trading on a wide-range of measures. With HFT accounting for as much as 70% of US equity market turnover, the US also enjoys the world's lowest institutional trading costs for large cap stocks.<sup>12</sup>

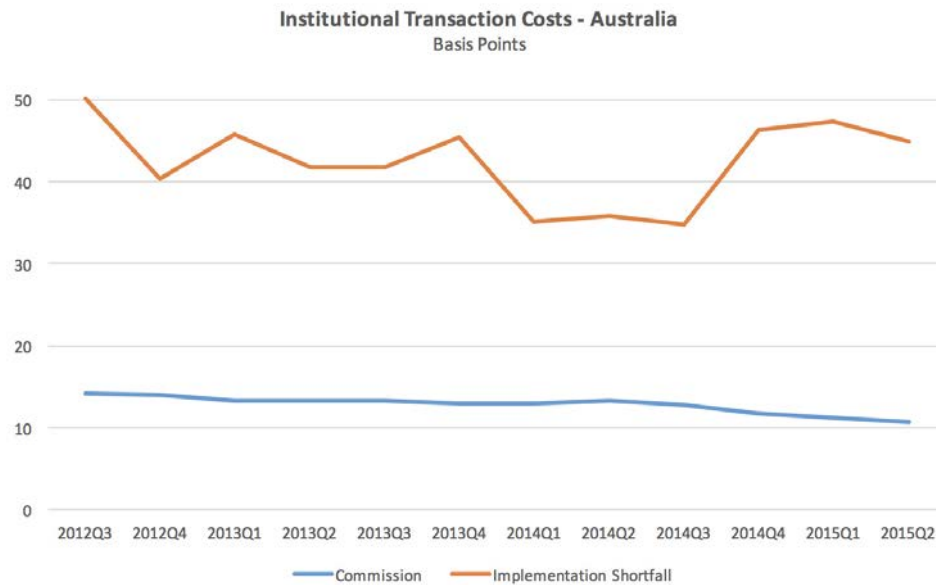
In Australian equity markets, institutional brokerage and transaction costs have been on a declining trend in recent years, consistent with overseas trends. Figure 1 shows average commission and implementation shortfall (the difference between arrival and execution prices) in

Australian equity markets measured in basis points as compiled by ITG, an independent broker-dealer.<sup>13</sup>

A similar level and trend for implied institutional commission rates is evident in a survey of Australian fund managers by Peter Lee Associates (Figure 2).

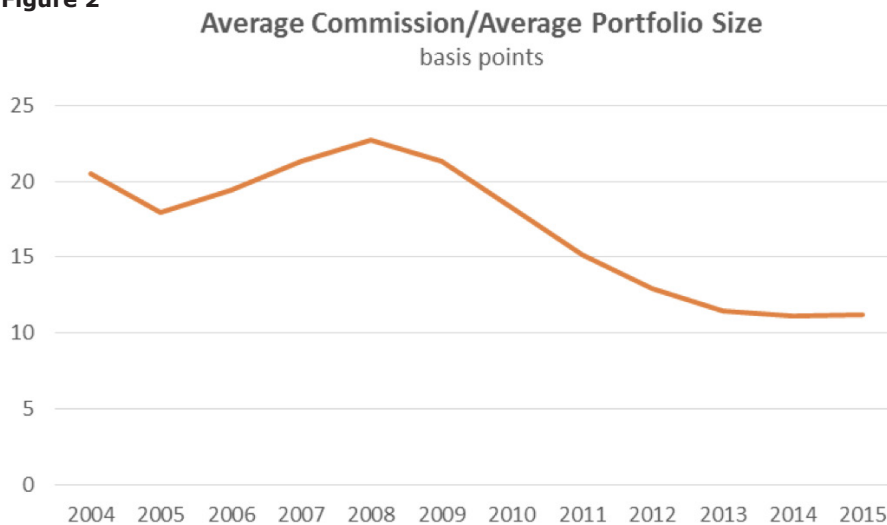
While the commissions and other transaction costs paid by Australian fund managers are influenced by a range of factors apart from the growth in HFT, the declining trend in these costs is consistent with the view that HFT lowers costs for investors.

**Figure 1**



Source: ITG

**Figure 2**



Source: Peter Lee Associates

### **Increased Liquidity**

HFT provides liquidity in markets, which is essential to their functioning. Liquidity can be defined as the ease with which market participants can buy or sell financial instruments or securities. It is usually measured by reference to the spread between buying and selling prices, although measures of market depth (the volume of a security on bid or offer), the time taken to complete a trade (immediacy), total turnover and turnover ratios are also relevant measures of market liquidity.

By adding to market liquidity, HFT narrows buy-sell spreads and lowers the cost of trading. HFT has also been important in driving reductions in tick sizes, which facilitates the narrowing in spreads.

HFT imposes a positive externality on market participants, because HFT firms do not fully capture all of the benefits of HFT in lowering trading costs for other market participants,<sup>14</sup> nor do they fully capture the social value of the information generated through price discovery in financial markets.

### **Increased Efficiency**

By lowering transaction costs, HFT improves the efficiency of markets. The main function of financial markets is price discovery, which in turn coordinates the economy-wide capital allocation process. The efficiency of financial markets can be defined as the speed with which markets incorporate new information in asset prices. The increased velocity of trading through HFT ensures that market prices reflect new information more quickly. Much of the innovation in financial markets historically has been driven by the desire to profit from bringing information to market more quickly.

### **Higher Returns for Investors**

Transaction costs subtract from returns to investors. Lowering transaction costs raises returns to investors and thus asset prices. It follows that any permanent reduction in transaction costs through innovations such as HFT will lead to a permanent increase in asset prices and a positive wealth effect from the increased value of investors' portfolios.

### **Lower Cost of Capital**

Higher asset prices also lower the cost of capital for firms, increasing investment, the capital stock,

productivity, real wages and living standards. As Jones notes, 'this is the main channel by which HFT can have societal value.'<sup>15</sup>

### **Profitability and Market Efficiency**

As financial markets become more efficient, the profitable trading opportunities available to HFT firms are reduced. As in any other industry, the competitive entry of HFT firms exploiting new technologies can be expected to reduce profits available to HFT and algorithmic trading over time. At some point, the marginal cost of deploying new HFT technologies will exceed the marginal benefit available from HFT-based trading strategies. Trends in the profitability of HFT firms may be indicative of the efficiency of financial markets.

### **Lower Volatility**

Empirical evidence overwhelmingly supports the conclusion that HFT enhances market quality and reduces market volatility.<sup>16</sup> HFT smooths market prices by trading against transitory price changes and in the direction of permanent price changes. There is also evidence that HFT reduces the probability of end-of-day price or market manipulation.<sup>17</sup> These are all natural consequences of the role of HFT in improving market liquidity and efficiency.

Lowering transaction costs raises returns to investors.

A common criticism of HFT is that because of the high order-to-trade ratio, the liquidity offered by HFT firms is 'fleeting' and therefore not real. It has been suggested that HFT liquidity evaporates in volatile markets. However, ASIC found that HFT entities 'displayed negligible change in their contribution to depth in the S&P/ASX 200 securities given different states of volatility.'<sup>18</sup>

The high rate of order amendments or cancellations is not in itself evidence of 'fake' liquidity. From the standpoint of other market participants demanding liquidity, what matters is the number of quotes supplied by HFT firms that are actually filled or traded against. The market share of HFT firms in overall market turnover is a more relevant measure of their contribution to

market liquidity. High order-to-trade ratios are symptomatic of the speed and efficiency HFT firms bring to trade execution, which enhances liquidity, even if many of those orders are amended or cancelled. A high order-to-trade ratio is to be expected in an environment of narrowing spreads and smaller tick sizes, which necessitates more frequent updating of orders in response to smaller price movements.

Charles Jones's survey of the literature finds that:

*Based on the vast majority of the empirical work to date, HFT and automated, competing markets improve market liquidity, reduce trading costs, and make stock prices more efficient. Better liquidity lowers the cost of equity capital for firms, which is an important positive for the real economy. Minor regulatory tweaks may be in order, but those formulating policy should be especially careful not to reverse the liquidity improvements of the last twenty years...*

These above normal profits can be expected to be competed away over time.

*Empirically, the challenge is to measure the incremental effect of HFT on top of all the other changes in equity markets. The best papers for this purpose identify market structure changes that facilitate HFT. There have been several such changes, and the results in these papers are consistent. Every time there has been a market structure change that results in more HFT, liquidity and overall market quality have improved. It appears that market quality improves because automated market-makers and other liquidity suppliers are better able to adjust their quotes in response to new information.<sup>19</sup>*

### What are the costs of HFT?

HFT firms act as intermediaries in the market. HFT firms earn trading revenues and make profits in their role as market makers and suppliers of liquidity and through arbitrage strategies. In this sense, they

are no different from other market intermediaries such as broker-dealers and the suppliers of other trade and post-trade services, including clearing and settlement. In supplying services to financial markets, intermediaries impose costs on other market participants, but also confer benefits, as discussed above.

The revenues or profits earned by HFT firms are often said to be a cost to other financial market participants. But these revenues and profits are no different to those that accrue to any other supplier of services to financial markets.

ASIC estimate that HFT imposes costs on other Australian equity market users of between 0.7 and 1.14 basis points, compared to 1-5 basis points for institutional brokerage and 20-30 points for retail brokerage.<sup>20</sup> However, as ASIC also notes, these costs need to be compared to the benefits of HFT in reducing overall transaction costs, improving market efficiency and reducing market volatility. ASIC rejects claims made by the Industry Super Network and others about the costs of HFT to investors, saying that 'these claims are not supported by our analysis.'<sup>21</sup>

The revenues and profits of HFT firms also need to be compared to those of the other financial intermediaries they have displaced. To the extent that these profits are lower than more traditional broker-dealer intermediaries, it is misleading to suggest that HFT imposes an additional cost on other market participants when in fact they confer a saving that benefits other market participants relative to a counter-factual in which there was less or no HFT activity

The profitability of HFT may be indicative of informational and other inefficiencies in financial market prices, but HFT reduces these inefficiencies, it does not cause them. HFT firms may earn above-normal profits from non-reproducible advantages flowing from technological innovation, but these above normal profits can be expected to be competed away over time as algorithmic trading technologies and associated strategies diffuse to other market participants.

The profitability of HFT represents returns to entrepreneurship and innovation and is symptomatic of the competitive pressure HFT firms bring to financial markets. The distribution of

profits between market participants is not in itself a cause for concern from a public policy standpoint. The relevant public policy question is the net economic benefits of HFT to society as a whole.

HFT can be both a supplier and demander of market liquidity. HFT demands liquidity when it takes the active rather than the passive side of a trade. However, HFT still serves a stabilising role, by consuming liquidity when spreads are tight and supplying liquidity when spreads are wide, limiting the extent of spread widening.<sup>22</sup> Empirical studies find that HFT is generally a net supplier of liquidity, even during episodes of market volatility.

The costs of upgrading market infrastructure to accommodate HFT are sometimes cited as a cost to other market participants. However, technology-driven upgrades to market infrastructure are essential to the long-run declines in the cost of trading flowing from automation already discussed. The fact that HFT drives upgrades in financial market infrastructure to enable it to take advantage of new technologies should be seen as a benefit to the market rather than a cost.

### Has HFT caused ‘flash crashes’?

So-called ‘flash crashes’ (or rallies) are sharp, short-term movements in prices that do not have a readily apparent fundamental basis. Flash crashes are not a modern development and have always been a feature of financial markets. On 28 May 1962, well before the advent of electronic trading, some major US equities listed on the New York Stock Exchange fell 9% in 12 minutes.<sup>23</sup>

Official and unofficial studies of flash crash (or rally) episodes have found that not only is HFT not the cause of these episodes, but that HFT firms generally continued to supply liquidity through these events and acted as a stabilising rather than destabilising force for market prices.<sup>24</sup> To the extent that HFT profits from market volatility, it does so by smoothing that volatility, giving HFT firms an incentive to trade in volatile markets.

There is evidence that HFT firms may sometimes step aside and fail to provide liquidity during extreme volatility episodes. This is generally in response to internal risk controls or capital constraints and is no different in motivation from other intermediaries who are also constrained in their ability to manage

extreme volatility. Traditional market makers engaged in manual trading simply failed or refused to answer the phone during such episodes.

Faulty or poorly designed trade execution and other algorithms have been implicated in some volatility episodes, but this problem is not unique to HFT. Human error (for example, ‘fat finger’ trades) has also been implicated in market disruptions. Any technology for trading is potentially prone to malfunction or errors.

Market trading curbs and circuit breakers can be used to manage volatility episodes and provide opportunities for market participants to correct problems with algorithmic trading and have been effective regulatory tools for managing previous episodes of market volatility.

### Is HFT predatory or manipulative?

Market manipulation is as old as financial markets. Like any technology, HFT can be abused. Market manipulation is illegal in most jurisdictions. HFT firms have just as much interest in promoting fair and orderly markets as other market participants.

Allegations of market abuse through HFT are asserted more frequently than they are demonstrated. The UK Government Office for Science commissioned three empirical studies as part of a much wider investigation into computer-based trading found ‘no direct evidence of a link between HFT and market abuse.’<sup>25</sup>

Technology-driven upgrades to market infrastructure are essential to the long-run declines in the cost of trading.

There are a number of potential forms of market abuse that could be executed via HFT. So-called ‘layering’ and ‘spoofing’ strategies involving placing orders without an intent to trade are illegal in many jurisdictions. These strategies are not confined to HFT, although associated technologies may facilitate such strategies. ‘Quote stuffing’ involves overwhelming computer systems with a large number of order updates to slow other firms’ price adjustment, but this is not a common practice because it is not easy to do. These strategies constitute market abuse under ASIC’s Market Integrity Rules

and are enforced accordingly, although it should be noted that market integrity breaches are a very small proportion of ASIC's enforcement actions.

Some trading strategies employing HFT aim to detect and trade ahead of large institutional orders, potentially increasing trade execution costs for large institutions like fund managers, a cost that could then be passed on to retail investors. This practice is sometimes misleadingly called 'front-running.' 'Front-running' has a legal and regulatory meaning and refers to the practice of trading ahead of client orders or on the basis of client information. Trading on the basis of public information using order detection algorithms is entirely legitimate and should be distinguished from practices which involve trading on the basis of client information. Since HFT firms do not have clients, they cannot trade based on client information and engage in 'front-running.'

Michael Lewis's book *Flash Boys* popularised the notion that the US stock market is rigged by HFT at a cost to retail investors.

Order protection rules in central limit order books are designed to protect financial markets from abusive behaviour. Large block trades on the part of institutions are often executed in limited display venues (so-called 'dark pools') rather than 'lit' markets, with a view to preventing movements in price due to large block trades and to protect them from HFT strategies. Fund managers can themselves use algorithms to detect noise created by HFT and informed trading. To the extent that HFT trades against temporary price changes of the type likely to be associated with large block trades, it lowers institutional transaction costs, to the benefit of retail savers and investors.<sup>26</sup> The use of dark pools and the internalisation of retail orders to 'protect' them from HFT may in fact increase costs to retail and other investors.

There is some evidence of HFT firms trading ahead of non-HFT participants in the Australian equity market, increasing limit order transaction costs for the latter due to an increase in execution

shortfall, at least based on one unpublished study.<sup>27</sup> However, this is more of a distributional issue and is not necessarily inconsistent with the view that HFT lowers overall transaction costs over time. The long-term decline in institutional trading costs in the US equity market, which is characterised by a large HFT share of total market turnover, is indicative of the overall reduction in transaction costs attributable to HFT. In weighing the costs and benefits of HFT, it is important to distinguish between static costs to individual markets participants and long-run dynamic gains to the market as a whole due to declining transaction costs.

### Is HFT unfair?

Market participants and regulators seek to ensure that markets are procedurally fair in the sense of providing equal treatment and equality of opportunity. However, financial markets are not intended to provide fairness in terms of equality of outcomes. In the context of a well-regulated market, HFT is procedurally fair, but may result in unequal outcomes for different market participants. In particular, HFT firms may profit at the expense of other market participants. As Angel and McCabe note, HFT 'does no more to perpetuate the inherent unfairness – in the sense of equality of outcomes – of life than many other features of our capital markets.'<sup>28</sup> Because HFT is more efficient in supplying liquidity, it is likely to win market share from other less efficient financial market intermediaries in a competitive market.

The desire for speed in trade execution is fundamental to financial markets and part of what keeps them informationally efficient. Michael Lewis's book *Flash Boys* popularised the notion that the US stock market is rigged by HFT at a cost to retail investors. However, his book presents no evidence that such 'rigging' takes place. As Peter Kovac notes, 'Lewis' allegations of an omnipresent front-running scheme rest almost entirely upon three anecdotes and three hypothetical examples... His entire theory is based solely upon the fact that the market showed a new price after a large trade.' Lewis missed the real story, namely, the benefits to retail investors from the rise of 'a diverse multitude of firms constantly competing to offer better prices' at the expense of traditional equity broker-dealers.<sup>29</sup>

HFT firms seek advantages over other market participants, in particular, by increasing the speed of trade execution. A prominent example of this practice is the co-location of the servers of HFT firms with the trading venues' matching engines. HFT firms are not unique in this regard, with buy-side institutions and data vendors also seeking speed advantages from co-location. ASIC's review of HFT in the Australian equity market concluded that 'we do not regard the fact that market participants can co-locate to obtain a speed advantage as inherently unfair.'<sup>30</sup>

There is nothing new in seeking speed advantages in trade execution. Open outcry trading pits are characterised by jockeying for positional advantages on the trading floor. Automated trading is more amenable to the creation of a level playing field than physical trading floors. Most exchanges require equal length and bandwidth for cables connecting co-located trading infrastructure to the trading venue's matching-engine. So long as such access is provided on a non-discriminatory basis, automated trading is more conducive to the creation of a level playing field than older trading technologies where speed of execution depended, among other things, on how quickly a broker answered the phone.

It should also be noted that algorithmic trading technologies are not limited to specialist firms or large institutions. Individual retail investors have also designed and implemented their own trading algorithms.<sup>31</sup> While some HFT technologies may be beyond the reach of individual investors, this is true of many other resources and is not procedurally unfair.

Suppressing HFT through regulation or taxes is unfair to the many market participants who would then be denied the benefits associated with HFT discussed above. As Bell suggests, 'there is no regulatory solution to make markets truly equal in terms of trading advantages or information distribution and processing. All regulatory intervention can do is move the advantage around.'<sup>32</sup>

### Why not tax HFT with a Financial Transaction Tax?

A financial transaction tax (FTT) is a tax on the gross market value of a financial transaction. Securities transaction taxes (STTs) are a type of

FTT that taxes financial securities such as equity and debt instruments or their derivatives. FTTs can be imposed on the buyer, seller or both. As with other taxes, the economic burden of the tax does not depend on which side of the market the tax is applied to.

FTTs are sometimes called Tobin taxes, after James Tobin, who proposed an internationally uniform tax of one percent on currency transactions. Tobin's proposal was designed to address 'excessively efficient international money markets.' The problem as Tobin saw it was that other political and economic institutions were not as internationalised as financial markets, limiting the ability of governments to effectively manage national economic policies in the context of floating exchange rate regimes and cross-border capital flows. This prompted his recommendation for a FTT as a 'second best way out, forcing some segmentation of inter-currency financial markets.'<sup>33</sup> Yet experience with floating exchange rate regimes and cross-border capital flows has invalidated Tobin's concerns, rendering his proposed FTT a second-best solution in search of a first-order problem.<sup>34</sup>

For a small open economy like Australia, taxes on capital such as a FTT would induce capital outflows.

FTTs are also known as Robin Hood taxes based on the mistaken notion that they tax the rich at the expense of the poor. Many interest groups covet the revenue they believe could be raised through a FTT.<sup>35</sup> This idea rests on the mistaken assumption that the burden of the tax falls on financial intermediaries when in fact the tax burden falls on the consumers of financial services and investors through higher transaction costs. For a small open economy like Australia, taxes on capital such as a FTT would induce capital outflows until the after tax return on capital is restored to that of the rest of the world. The burden of the tax would fall on workers through a lower capital stock, reduced productivity and real wages.<sup>36</sup>

A FTT can be contrasted with a goods and services tax (GST) on financial services, which taxes only net value or value-added. Unlike a GST on



financial services, a FTT is not creditable against future taxes, so the tax ‘cascades’ through the production chain for financial services. The more frequently a financial security trades, the higher the effective, as opposed to the notional tax rate. The effective tax rate of a STT can be as much as ten times the notional tax rate when the impact of cascading is fully accounted for.<sup>37</sup> With as many as 10 transactions taking place in a bond settlement chain, a FTT can amount to more than the one-year return on some types of bonds, raising the cost of capital for firms and governments.<sup>38</sup> FTTs are capitalised more heavily into securities with high turnover, such as large cap equities favoured by long-term investors such as superannuation funds.<sup>39</sup> The incidence of such taxes can thus be highly distortionary, even within a given asset class.

There is plenty of evidence that FTTs and higher transaction costs increase rather than reduce market volatility.

As the 2010 Henry tax review noted, ‘transaction taxes like the Tobin tax are generally inefficient because the tax rate rises according to how often an asset changes hands, rather than any underlying economic value.’ Henry also noted that such taxes fail to address the source of any perceived market failure because there is no necessary relationship between trading volumes and market failure. By reducing market efficiency, transaction taxes can lead to greater problems in financial markets. The Henry review dismissed a Tobin tax as an inefficient and ineffective revenue-raiser.<sup>40</sup>

By reducing the incentive to trade, a FTT compounds the lock-in effect from other transaction taxes such as stamp duties and capital gains taxes, reducing the agility of capital and increasing inefficiencies in capital allocation. Transaction taxes can be easily avoided by not transacting. The resulting reduction in economic activity accounts for why these taxes are particularly inefficient revenue raisers. A FTT can impose negative fiscal externalities on other sources of government revenue, such as capital gains tax and company tax.

A fundamental economic principle is that if you tax something, you get less of it. By taxing financial

transactions, including those related to HFT, there is a reduction in market liquidity due to the inverse relationship between transaction costs and trading volumes. The long-run elasticity of equity market trading volumes to transaction costs is estimated to range between -1% and -1.7%.<sup>41</sup> Asset value elasticities with respect to transaction costs have been estimated in the range of -0.15% and -0.4%.<sup>42</sup>

Higher transaction costs destroy the market liquidity that ultimately benefits consumers and investors. Higher transaction costs lower rates of return and depress asset prices. A FTT would devalue the stock of wealth in the securities to which it was applied at the time of its introduction. A FTT applied to HFT that raised transaction costs in markets for equity and debt securities would devalue the stock of saving in Australian superannuation funds.

FTTs increase the risk premium that hedgers have to pay to speculators who provide market liquidity, undermining the risk management function of financial markets and increasing the exposure of business, consumers and investors to market volatility.<sup>43</sup>

FTTs have also been proposed as a means of suppressing financial market volatility, both in the context of HFT and more generally. There is a widely held view that FTTs can be used to suppress ‘noise’ trading or speculation without harming ‘fundamental’ trading. But this distinction is difficult to maintain either conceptually or in practice. As Matheson notes, ‘this inability of an STT to discriminate between discouraging stabilising and destabilising trading activity is a principal reason for its rejection by many analysts.’<sup>44</sup> Contrary to a widely held belief, the holding period or rate of turnover in a security does not necessarily imply anything about the time horizon of the investor. It is the duration of exposure to an asset class rather than individual securities that matters most to the time horizon and performance of an investor’s portfolio.

There is plenty of evidence that FTTs and higher transaction costs increase rather than reduce market volatility.<sup>45</sup> Markets that are characterised by very high transaction costs, such as a real estate markets, can also exhibit pronounced price volatility, in part, by increasing lock-in effects that prevent supply from accommodating changes in demand. The

experience of many real estate markets demonstrates that high transaction costs do not necessarily reduce price volatility.<sup>46</sup>

There have been proposals to impose financial transaction taxes (FTTs) on HFT both in Australia and abroad, either as a revenue-raising measure, or as a way of suppressing HFT activity in markets. Because of the small margins earned on HFT, even a very low rate FTT could serve to completely eliminate HFT from the market and its associated benefits. A FTT would have a similarly severe impact on other low margin financial instruments such as repurchase agreements. A tax that suppresses or eliminates HFT will not raise much revenue, so these two policy objectives are in conflict. Order cancellation fees or message taxes (such as those imposed by ASIC to fund market supervision arrangements), also have the effect of discouraging HFT, although will have a different economic incidence than taxes on the market value of financial transactions.

Different jurisdictions have taken different approaches to either promoting or discouraging HFT. Countries such as Japan and Singapore have sought to create regulatory and tax environments that support HFT activity in their markets. By contrast, many European countries have actively sought to suppress HFT through taxes and regulation.<sup>47</sup> For Australia to be competitive as a regional and global financial centre, it is important that the tax and regulatory environment support HFT. Otherwise, HFT activity will shift to other jurisdictions and the benefits to Australian financial markets will be lost.

International experience with FTTs is telling. Sweden's experiment with a FTT in the 1980s was disastrous before it was removed in April 1990. Stock market turnover fell by 60% and market value fell by 5.3%.<sup>48</sup> The FTT raised only 3% of the expected revenue and led to a 98% reduction in futures trading, an 85% reduction in bond trading upon announcement, while 50% of equity trading moved to London.<sup>49</sup> Capital gains tax revenue fell by more than the revenue raised by the FTT, so the FTT was overall revenue negative.<sup>50</sup>

In 2012, France implemented a range of FTTs, including a non-transaction tax of 0.01% on cancelled or amended equity market orders above a

threshold of 80% of all orders transmitted within a month designed to curb HFT. As a result, France's share of European equity market turnover almost halved, from 23% to 12.85%, between 2011 and 2013.<sup>51</sup> The tax has raised less than half the revenue expected<sup>52</sup> and has led to a reduction in market quality.<sup>53</sup>

In the US context, it has been estimated that a FTT of as little as 0.02% would be sufficient to wipe out all S&P 500 index futures transactions, raising no revenue and destroying the ability of fund managers and firms to hedge equity market risk.<sup>54</sup>

The overwhelming weight of theory and evidence comes down against the imposition of FTTs, including in the case of HFT. As Jones summarises:

*The evidence indicates that these taxes reduce share prices, increase volatility, reduce price efficiency, worsen liquidity, increase trading costs, and cause trading to move offshore.*<sup>55</sup>

International experience with FTTs is telling.

## Summary

Computer-based trading is widely misunderstood. In particular, it has been claimed that high frequency trading imposes costs on retail investors. In fact, algorithmic trading, including HFT, enhances market quality and efficiency by increasing liquidity, lowering bid-ask spreads, facilitating price discovery and lowering the volatility of the prices for financial assets. By lowering transaction costs, HFT raises rates of return to investors and boosts asset prices. However, HFT is not neutral in its distributional implications. HFT can disintermediate and impose costs on individual market participants, including other HFT firms. From a public policy standpoint, these distributional implications are secondary to the overall net economic benefits conferred by HFT.

Regulatory frameworks need to adapt to and accommodate the innovations associated with AT and HFT to ensure that these benefits flow through to consumers and investors. Proposals to suppress HFT through regulation or taxation (such as financial transaction taxes) are inefficient ways of addressing

the issues raised by HFT. By raising transaction costs, they would raise the cost of capital to firms and governments, lower rates of return for investors and devalue the stock of wealth accumulated in Australian superannuation funds.

## Endnotes

- 1 Michael Lewis, *Flash Boys: A Wall Street Revolt*, First edition (W. W. Norton & Company, 2015).
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