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*TRANSCRIPT OF "FILE ON 4" – "HIGH FREQUENCY TRADING"*

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*REPORTER: Michael Robinson*

*PRODUCER: Sally Chesworth*

*EDITOR: David Ross*

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THE ATTACHED TRANSCRIPT WAS TYPED FROM A RECORDING AND NOT COPIED FROM AN ORIGINAL SCRIPT. BECAUSE OF THE RISK OF MISHEARING AND THE DIFFICULTY IN SOME CASES OF IDENTIFYING INDIVIDUAL SPEAKERS, THE BBC CANNOT VOUCH FOR ITS COMPLETE ACCURACY.

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ROBINSON: While British taxpayers dig into their wallets once again to bail out bank losses, Tonight we look at how some banks are now making big profits in a huge computerised share trading game.

BONNANO: This particular system is currently sized to handle about 400,000 transactions a second.

ROBINSON: We reveal how this kind of trading is creating a new investment landscape of information haves and have nots.

ARNUK: The market has become two tiers of investors – the schlep of us, the common Joe, and the one half of one percent who can invest hundreds of millions of dollars in special technology so that they can get there a half second or a millisecond before you.

ROBINSON: And we ask what chance regulators have of ever controlling casino bankers.

KAY: Are junior officials in public agency actually going to be able to impose effective discipline and constraints on Ferrari-driving bankers getting paid large multiples of what it is they're earning? It's an illusion to believe that we can effectively control the activities of the casino.

## SIGNATURE TUNE

### ACTUALITY IN JERSEY CITY

BONNANO: We are bird's eye view from New York City, just across the river in Jersey City. What you're going to see is an unmarked building, and that's kind of a desirable thing, because you don't want to advertise exactly what this building is, and that's for security purposes.

ROBINSON: Last month I was taken on a journey to a building housing one of the new battlegrounds of modern finance. I promised my guide, Steve Bonnano, not to reveal its precise location, only to say it's in New Jersey, across the Hudson River from New York. The building boasts some of the toughest security procedures I've ever experienced.

### ACTUALITY IN FINANCE BUILDING

BONNANO: So I'm entering my personal code and then putting my hand on top of the scanner for verification. There's five levels of biometric scanners for authorised personnel to enter into the facility.

ROBINSON: And what happens if you don't pass?

BONNANO: It's a man trap.

ROBINSON: A man trap?

BONNANO: A man trap, yes. Basically just another layer of security that ensures that if someone does fraudulently enter through one of these security checkpoints that they would not be able to do so a second time. You would be trapped within that small room there.

ROBINSON: So don't try and come in here if you haven't got business here.

BONNANO: Would not recommend it.

ROBINSON: Steve Bonnano's company, Direct Edge, rents space for its computers in this building, along with hundreds of other share trading operations. Eventually we got through security and into the main computer area.

#### ACTUALITY IN COMPUTER AREA

BONNANO: Okay, this one we have to open ourselves. [DOOR OPENS]

ROBINSON: Wow, we're in some huge, rather dark room with a cage with machines behind it. Is this your computer in that cage?

BONNANO: This is not ours.

ROBINSON: Okay, that's somebody else's?

BONNANO: That's another non descript, whomever that is, I would not be able to tell, and nor would I have access to it.

ROBINSON: You don't even know who it is?

BONNANO: That's correct.

ROBINSON: Through the gloom, as far as my eyes could see, were unmarked cages, each with its own biometric security hand scanner. Apart from us, nobody seemed to be present – just the computers and the hum of a powerful air conditioner to keep them cool. It was like a giant cyber game, where computer programs constantly vie with one another for split second advantage. The purpose of the vast facility is so the computers can be as close to one another as possible, to trade shares even faster. In the jargon of the high frequency business, this is called co-location.

This is huge. I mean, looking down there it's what – 80 yards, 100 yards long, that corridor?

BONNANO: Yes, the facility ....

ROBINSON: Computers all the way down.

BONNANO: Yes, this building is probably about three football fields' worth of co-location space.

ROBINSON: Three football fields full of computers, all to trade stocks and shares? It's amazing, absolutely amazing.

Finally Steve Bonnano reached one of Direct Edge's own computer-filled cages and took me inside.

#### ACTUALITY IN CAGE

BONNANO: All of the customer connections will terminate within this cage. This is where the match will happen, where the match will or will not happen.

ROBINSON: How rapidly can those computers process an order?

BONNANO: In microseconds.

ROBINSON: What's a microsecond?

BONNANO: A microsecond is a millionth of a second, so you're talking about this particular platform, early indications or early tests that we've done have us in the 300 to 500 microsecond response time.

ROBINSON: So that's 300 to 500 millionths of a second?

BONNANO: Correct.

ROBINSON: So how many trades can that do in a second?

BONNANO: This particular system is currently sized to handle about 400,000 transactions a second.

ROBINSON: Why do you need 400,000 transactions in one second?

BONNANO: Well, you know, that's a great question. We're just prepared for active markets.

ROBINSON: The way high frequency trading is growing, that spare capacity may be needed soon. Direct Edge is a new kind of computerised people-free stock exchange, and on its own it now accounts for almost 13% of all share trading in America. That makes it the third largest stock market in the US and about as big as the London Stock Exchange. And all that, Chief Executive Bill O'Brien told me, from next to nothing just two years ago.

O'BRIEN: With the advent of computing power, just telecommunications, the bandwidth that allows this information to travel more freely, there really is very little need to have human beings interacting within a common building. The internet is the biggest example of this, you know, Twitter, other social media, millions of individuals can react in real time with each other from everywhere all over the globe, and trading is no different and now is reflective of that, that kind of interconnected world in which we live.

ROBINSON: Bill O'Brien says this new computerised trading world is highly competitive. Dozens of exchanges, big and small, now compete to trade shares faster and cheaper and that, he says, benefits everyone buying or selling shares.

O'BRIEN: Ten years ago they might have cost you \$30 or \$40 or \$50, required you to call on a phone, required you to pay also a spread of, you know, 12 or even 25 cents ....

ROBINSON: The difference between the buy and sell price?

O'BRIEN: The difference between the buy and sell price. But now, via the internet, from anywhere in the world, you can have that trade executed in less than a second, probably for just a few dollars a trade, and pay a spread of a penny.

ROBINSON: A penny instead of twelve?

O'BRIEN: Or 25. Exactly. That is a benefit to the average investor.

ROBINSON: It's also hugely to the benefit of the investment banks and traders which dominate high frequency trading. Armed with powerful computer programs, with names like Sniper or Hammer, according to one authoritative estimate, together they made \$21 billion from the business last year, which is why the people who write their complex programs are so very valuable.

## ACTUALITY OF MUSIC

WOMAN: Both of our couples have had such an exciting time preparing for tonight's competition.

COMPERE: So please welcome to the stage couple number one, Sergey and Elena from New York [APPLAUSE].

ROBINSON: Sergey Aleynikov, a keen amateur dancer, was one of those programmers. He used to work for the powerful American bank, Goldman Sachs. When he upped and left the bank earlier this year, high frequency trading was suddenly thrown into the media spotlight.

GOLDSTEIN: It was July 4<sup>th</sup> weekend which, as you know, is Independence Day here in the States, and my family, my wife and my kids were down at the New Jersey shore, visiting some friends for fireworks.

ROBINSON: Matt Goldstein, a reporter with Reuters in New York, was about to get a tip-off on a big story.

GOLDSTEIN: We got home, you know, sort of late, and I'd left my Blackberry home because I didn't want to be bothered with work over the holiday and there were a few urgent emails from a source I had not spoken to basically in a very long time – must call me, must call me. So, okay, you know, what is this about? So anyway, get the kids to bed and stuff and give this guy a call. He tells me this huge story but, you know, it's got to be hush hush. A computer programmer at Goldman Sachs, which, you know, is a very big US-based investment bank, was trying to steal their software code, code for this kind of trading program that's what's called high frequency trading, which is the super fast automated trading. Now I'd heard of high frequency trading but not that much of it, but it just sort of opened up this window, and when I did the first column story on it we referred to it as someone trying to steal Goldman's secret sauce.

ROBINSON: When they found their trading program was missing, Goldman Sachs sounded the alarm. The FBI leapt into action and two days later Sergey Aleynikov was arrested. He denies the charges, and lawyer Colleen Cassidy now represents him.

CASSIDY: He is charged with trying to steal trade secrets, a federal felony offence, and it is a serious charge. He is facing a potential prison sentence. It's very unusual, a case like this, in which it is alleged that the employee has taken trade secrets is most often pursued civilly. The Government were asking the court to keep him in jail pending trial, which again is extremely unusual in a white collar case like this. That's only done when there is really a serious risk of flight. I don't know why this was treated so exceptionally and so harshly, except perhaps banks are starting to crack down and want to send a message maybe.



ROBINSON cont: as algorithms, are set up to detect what he's doing and to profit from it. To show me how quickly high frequency computers now respond, Sal entered an order to sell a small parcel of three hundred shares in a medium sized American company at \$70.35 a share.

ARNUK: Watch what happens when I put in my 35 cent offer. You're going to see someone else will probably hit the bids out in front of me automatically and offer stock ahead of me.

ROBINSON: Sal is an experienced share trader and knows all about how shares go up when people buy and down when they sell. But he says the speed and intensity of the automated reactions in high frequency trading is something new. So, tell me what's happening.

ARNUK: As I entered the stock at 35 cents, in an automated way, someone has come out and sold at 34 cents stock, 33 cents stock ahead of my offer. They are trying to sell stock ahead of me to take advantage of getting higher prices before I start selling it. Their hope is that they just sold 800 shares at 33 and 34 cents and the stock is going to go down and they'll be able to buy those shares back cheaper, and that's how they're hoping to make money.

ROBINSON: Okay, so they sell at one price, they buy them back cheaper, they make the difference.

ARNUK: And here, as we're speaking, notice here's my offer, my presence has just sent the high frequency algorithms in motion and they are in an automated way – it's not a human being making these decisions – it's an automated computer who just figured out that I'm there, and they started to sell stock ahead of me and drive the price down. And they're going to do this all day long in a systematic way. It's almost like guerrilla warfare.

ROBINSON: To protect his clients, Sal Arnuk now chops up their orders into tiny parcels of shares, ducking and diving from exchange to exchange, trying to disguise his intentions. High frequency trading has soared – from around 20% a few years



WEILD: One of the great lies, I think, is that high frequency ridiculously fast trading is adding value to the economy. It's not. By making these markets ridiculously efficient and hostile to small companies, we are in the process right now of killing off the feeder system for some of the most important companies on the face of the globe and on the face of western economies.

ROBINSON: Why does that matter?

WEILD: That matters because that's where our future is. That's where the next large companies come from, that create, you know, twenty, thirty, forty, fifty thousand jobs. That's where the job growth comes, that's where the future comes.

ROBINSON: With so much profit coming from high frequency trading, David Weild says it's an uphill struggle to persuade policy makers and regulators that there's a problem at all.

WEILD: It's a little bit like cancer and cigarettes, and for many many years there were the deniers that said that cigarettes didn't cause cancer, because it was a huge enterprise, huge economics invested in the cigarette industry, and it took the development of an enormous body of evidence to demonstrate that indeed cigarettes are harmful to your health. Well, hyper efficient trading is harmful to economic health, and it's going to take us developing an equal body of evidence to demonstrate that this computer-driven, hyper efficient trading kills off the ecosystem that supports small companies. Why do think stock markets exist? They don't really exist for investors to trade amongst themselves. They exist to allocate capital to enterprise, to create jobs and economic growth, and right now that part of markets is failing, and it's failing at an increasingly alarming rate.

ROBINSON: And what is the effect of that on your economy here?

WEILD: It's dragging the entire economy down.

ROBINSON: As high frequency trading hit the headlines, politicians have begun to take notice.

## ACTUALITY FROM COMMITTEE

KAUFMAN: Mr Chairman, our stock markets have evolved rapidly over the past few years in ways that raise important questions for this hearing to explore. Technological developments have far outpaced, far outpaced regulatory oversight.

ROBINSON: Last week on Capitol Hill, Senator Ted Kaufman testified before the members of the Senate Banking Committee on his fears that questionable practices in high frequency trading may be undermining American stock markets.

KAUFMAN: We risk creating a two-tiered market that is opaque and unfair to long term investors. I am very concerned that only timely and effective examination, such as what this Committee is going through, which leads to clear and enforceable rules, can maintain the integrity of US capital markets, which we all know is an essential component of our nation's success.

ROBINSON: Senator Kaufman is now pressing the American regulators to investigate.

KAUFMAN: Every American has a vested interest in credibility in markets. That's number one. Number two is fairness and we have to make sure that our markets are transparent fair. And my basic approach is that it's hard to see, under a high frequency trading scenario, where you're trading thousands of shares a second, how you can have transparency. When you don't have transparency, the opportunity for a procedure that's not fair to the traders, to the market, to the long term investors gets to be greyed, so basically those are the reasons people can get hurt.

ROBINSON: That issue is not confined to the US. London is a major centre of investment banking and, not surprisingly, high frequency trading is growing rapidly in Britain. A massive new computerised trading centre, just like the one in New Jersey, is now being constructed in Essex. At the Treasury, Financial Services Secretary, Lord Myners, already has doubts about the phenomenon. Before becoming a minister, he had 25 years experience as a fund manager.

MYNERS: I've been increasingly troubled that we seem to have found ourselves in a situation in which shares are to be bought and sold rather than being part of an ownership engagement between the investor and the company.

ROBINSON: What are the dangers there?

MYNERS: Well, I think the danger there is that nobody really seems to think of themselves as the owners.

ROBINSON: These trades are happening in a few millionths of a second, so fast that nobody can keep track of them.

MYNERS: Well investment bankers will tell you that this high frequency trading provides comfort to investors and it drives down the cost of capital and it's wholly beneficial.

ROBINSON: Do you believe that?

MYNERS: No. I think the fact that people can own shares for nanoseconds seems to be completely divorced from the concept of a joint stock company and distributed share ownership.

ROBINSON: But what's the danger?

MYNERS: Well, the danger is that companies become playthings of speculators. Whether it's gone too far, I think is pretty questionable. I'll be clearer – it's gone too far. It's now lost its supporting function for the provision of capital to business and has become a game to be played.

ROBINSON: Gaming is so intense that large investors like pension funds increasingly trade shares between themselves in so-called 'dark pools' away from the public stock markets. Dark pools mostly don't publish information about trades until after a deal is done, and that's why, as Marcus Hooper of the dark pool Pipeline Trading told me, it's harder for predatory traders to sniff out investors' true intentions.

HOOPER: Our process is very simple. It's a matching engine, so when willing buyer meets willing seller at an agreed price, they execute straightaway. That is the simplicity of the system, that's what it does. With our system they have the right, under the regulations, to keep that order silent prior to its execution. It's very much about controlling information content leaking into the market.

ROBINSON: And can you make any money out of the fact that you know these big trades are happening, as other people outside could?

HOOPER: No, we can't. The only form of revenue we can actually produce is by charging a fee on actually doing transactions.

ROBINSON: And what sort of fee do you charge?

HOOPER: Well it's actually very small – it's way below .1% so it's a relatively small figure.

ROBINSON: So on a £100 share would be, what, 10 pence?

HOOPER: It'd be less than that.

ROBINSON: Many dark pools, like Pipeline Trading, rely on commission alone, but not all are like that. Because many investment banks also offer dark pools as part of the complex of services they offer their clients. But banks are different, because as well as earning commissions by dealing for their clients, they can also deal in shares for their own account. Marcus Hooper says that gives banks plenty of potential to turn market intelligence into profit.

HOOPER: Well, they are clearly at a major advantage. I mean, anyone that has an awareness of large transaction flow in the marketplace clearly is going to be able to position their own situation and certainly is going to maximise their profitability. That's what every firm is interested in doing. If you go and you sell them a thousand shares, they may know that actually the price that you just sold them those shares at could actually be sold immediately somewhere else at a better price.

ROBINSON: At the same instant?

HOOPER: It could be potentially at exactly the same instant, absolutely.

ROBINSON: Large banks' potential for making profitable trades, Marcus Hooper says, is significant because, on top of their own flow of orders, their high frequency systems will be plugged into dozens of other exchanges and dark pools where opportunities to make profit can be found.

HOOPER: There are lots of orders in the marketplace at any given point in time, and very big firms will see a lot of that transaction flow. There are rules and regulations that are in place that will limit and prohibit the most obvious breaches, but the reality is, it's such a fragmented marketplace. It's virtually impossible to know where a transaction ends up when it's initiated.

ROBINSON: But if the bank is making a lot of money, who's losing it? Where's it coming from?

HOOPER: Well, in this environment, it comes straight off the underlying funds, so I mean, if we're talking about a pension or a unit trust, then that's who's paying for it.

ROBINSON: We asked some of the larger investment banks for an interview about this claimed advantage, but they declined. Instead we got to talk to John Serocold from the investment bankers' trade body, the Association of Financial Markets in Europe. He says investment banks have been permitted to trade directly with their clients since the 1980s and it's for investors like pension fund managers to watch out for their own interests.

SEROCOLD: These are professional money managers whose job it is to know how the market works. It's the money manager's responsibility to check the price in the market and see that he's happy with it.

ROBINSON: A lot of people have said to us the bank has a huge advantage here, because they're at the centre of so many trades, they know at any moment with their fantastically sophisticated technology, you know, what's available in the market, so they are in a good position to know that they could buy at 9.1 and sell at 9.5 instantly.

SEROCOLD: But we're talking about the situation of two professionals dealing with each other in the marketplace.

ROBINSON: But doesn't the bank have more information because of where it is? That's the point people are making.

SEROCOLD: The bank has a lot of information because of where it is and the bank has invested in making sure that its information is first class and reliable. Money managers are able to do the same thing.

ROBINSON: So it's basically down to the pension fund manager, the money manager here, it's up to them to check – it's caveat emptor?

SEROCOLD: It is caveat emptor. If I buy your car off you, you're happy with the price that you got for it, what I do with your car is my business. I might scrap it, I might sell it at a profit, I might sell it at a loss. That's my business. But the brokers are operating in a fiercely competitive, low margin market, so they will be sure to account to their clients for the business that they have done. They want to show their clients that they have done a good job for them. I can see the argument that the information in the market that the bank collects can give the bank a structural advantage, but against that a bank which regularly took advantage of its customers in its trading would soon be found out and those customers would be free to trade elsewhere.

ROBINSON: But even for professional fund managers, it may not be easy to work out what's going on when trading takes place across multiple exchanges and dark pools at unprecedented speed. Some experienced stockbrokers now complain that dark pools are making prices murky.

ACTUALITY WITH COMPUTER

ROBINSON: Let's have a look, can we see how much is being traded on BP or Vodafone?

KILLIK: This is a very powerful screen actually, it's got all the trades that have taken place in BP today.

ROBINSON: Right. But are these prices reacting to what's happening in the dark pools?

KILLIK: Well they can't, because they don't know what's going on in the dark pools. That's part of the secret of the dark pools.

ROBINSON: Paul Killik is head of the long established stockbroking firm that bears his name.

KILLIK: I think the concern a lot of us have is that there is business being transacted that we don't know is being transacted and that is not influencing that price. There is a tension here between a fair and open market and treating buyers and sellers equally and the need of a large institution to do its business discreetly without others knowing what it is doing. Is it right and fair that others shouldn't know what is going on? I am all for openness and transparency in markets.

ROBINSON: And is it right and fair, this present situation?

KILLIK: No, because you're not having everybody participating in the price formation process, and that's what a market is all about – the formation of a price that reflects the business that is being done. If there is a lot of sellers, a price should be falling. If there is a lot of buyers, the price should be rising. And when business is undertaken off-market, referencing only the price on-market, which is only a fraction, in some instances, of the business that is being done, it is not a true price. It's not seeing all the business. We were more transparent forty years ago than we are today.

ROBINSON: Transparency is an issue regulators are now examining. Eddy Wymeersch, the chairman of the Committee of European Securities Regulators, is trying to catch up with rapidly emerging new developments, like dark pools.

WYMEERCH: We still are looking at dark pools in the sense that the definition of dark pools is not very clear. Some people tell us that it's about 40% of the overall market. Other people tell us that it's less than 1%. So we have to find out where the reality is. If this volume of trading increases considerably, and that seems to be the case but I'm still not sure that it is so, but if it is the case I think you are undermining the system of pricing in general.

ROBINSON: Why does that matter?

WYMEERCH: Because your prices are not going to reflect a sufficiently large part of the market, because many people are basing their decisions on the prices that are made. If these prices are unreliable, that means that all of us are basing our decisions on unreliable prices. So if you step into an investment fund, you may be paying too much or too little and somebody else is losing, depending on the case. So I think this has to be made more reliable.

ROBINSON: The new complex, rapidly evolving trading landscape is now part of the wider regulatory debate over how to reduce banks' taste for trading and increase their interest in basic banking: taking in deposits, giving out loans and raising share finance for growing businesses. There's plenty at stake here. Banks trading for their own accounts led to the crisis and the first taxpayer bailout. Now that British taxpayers are being forced to foot a new round of bailout bills, politicians are desperate to find a way to avoid a future crisis. In London, business economist John Kay has been offering a radical solution – splitting the banks up so that taxpayers only cover the basic banking business while banks' casino operations fend for themselves.

KAY: It's an illusion to believe that we can effectively control the activities of the casino. You have to ask the question, are junior officials in a public agency actually going to be able to impose effective discipline and constraints on Ferrari-driving bankers getting paid large multiples of what it is they're earning. What we need to do is to separate the bits of the financial system that are essential for your and my and other non financial businesses' day to day activities, and ensure that whatever happens in the casino part of a wholesale financial system, that these key utility activities continue.



MYNERS: It's a matter of ensuring that more capital is required against the most risky activities, not against mainstream lending, mortgage lending, lending to small companies. If that's an inherently lower risk activity it should require less capital. If you increase the capital requirement for casino banking and hold steady the capital required for more conventional banking, the incentive effect is put in place to refocus efforts back towards mainstream banking, which is what the economy and society wants to see happen.

ROBINSON: But according to John Serocold of the investment banks' trade association, if regulators do instruct banks to hold more capital, that will reduce the amount banks are able to lend to the rest of the economy.

SEROCOLD: Banks may not be prepared to lend to riskier customers, so the money simply may not be available or it may be available more expensively.

ROBINSON: So if the regulators say to the banks, 'You've got to hold more capital because we think what you're doing is risky,' that's going to affect the real economy?

SEROCOLD: The capital which the banks hold will be provided by investors who need a return. The money that the banks pay away to investors means that the business that they do with their customers who borrow will be more expensive and it may also mean that there is less business that they are prepared to do.

ROBINSON: So they'll cut back their lending if they're told to keep more capital, effectively?

SEROCOLD: They will, and it is likely that they will also want to do less risky lending, so that businesses which would have been financed before cannot now be financed.

ROBINSON: That's bad news for a country in economic trouble and bad news for a government with an election looming. Have they been pressurising you with this argument? Is it one that they've been putting to you?



SEROCOLD: Yes, I think the banks do put those arguments forward, but I think they recognise here in the UK that the commitment of the Government and the FSA to refocusing banking on traditional banking and making casino banking less attractive is one on which we're not going to be moved.

ROBINSON: How can any regulator, however bright, possibly judge, you know, the complexity inside a bank, how much risk it's taking? Because the banks are very good at, you know, if the regulator says, 'You've got to do this,' finding a way around it.

SEROCOLD: Well, one of the lessons we've learned over the last two years, Michael, is that the banks themselves didn't understand the risks they were taking.

ROBINSON: Then how can the regulator understand?

SEROCOLD: Well, one of the things you would then conclude is that if you don't understand it, you shouldn't be doing it.

ROBINSON: Well that's why people say break it up, that's why it's too big.

SEROCOLD: Well, I think if you break it up, you may achieve that if you make it no longer profitable for a retail bank to involve itself in casino banking by requiring it to hold so much capital against that activity that they will simply conclude they won't do that. On that basis there's a lot of agreement between the position taken by the Governor of the Bank of England, by the FSA and the Treasury. That is to say the banking system needs to be significantly de-risked.

ROBINSON: And you think regulators are up to facing up to these battalions of well paid bankers and advisors on the other side, obviously wanting to keep their flexibility to trade riskily in the casino going?

SEROCOLD: Well, I think the quality of regulation and the resource we put behind it, and therefore the cost to regulation will have to increase. That's a perfectly reasonable demand from the taxpayer to ensure that they never again have to fork out to pay up for the mistakes that are made by bankers.

ROBINSON: When it comes to controlling bankers though, history has shown that 'ensure' is an ambitious word. The desire to go on trading and the rewards that can bring mean that bankers are likely to go on looking for the edge.

SIGNATURE TUNE