DRN-3665237

The complaint

Mr P complains that Sainsbury's Bank Plc declined his claim for a refund under section 75 of the Consumer Credit Act 1974 in relation to his purchase of some graphics cards.

What happened

In September 2017 Mr P bought some graphics cards from a third party which I will call C. He wanted to use them for cryptocurrency mining. He paid €766.90 for them with his Sainsbury's Bank credit card (which in sterling came to £705.07). This payment passed through his PayPal account to C, so there is a dispute about whether section 75 applies.

In December 2020 Mr P contacted Sainsbury's Bank to ask for a refund of his purchase under section 75, a law which (where it applies) makes the provider of credit liable for certain problems involving goods bought on credit. Mr P said the graphics cards' hash rate (performance) had been declining, and that they were not fit for the purpose he had bought them for. However, Sainsbury's Bank told him that section 75 did not apply to his purchase, because his payment had not been made directly to C but via his PayPal account.

Being dissatisfied with that answer, Mr P brought this complaint to our service. Our investigator disagreed with Sainsbury's Bank on the subject of whether section 75 applied: he said that the involvement of PayPal did not make a difference. He went on to find:

- The cards' hash rate was lower than that of cards made by other manufacturers;
- The cards had still been under warranty when Mr P complained about them;[1]
- The manufacturer's website had said that the cards were suitable for crypto-mining, and C had not told him otherwise;
- Mr P would not have bought the cards if he had been told they were not suitable for crypto-mining.

For these reasons, the investigator upheld this complaint, and recommended that Sainsbury's Bank refund Mr P in full, with interest.

Sainsbury's Bank did not accept that opinion. It argued that as Mr P had voluntarily involved PayPal (and not because it had been required by C), PayPal had not been acting merely as a payment processor, and so section 75 did not apply. The bank also said there was no evidence that the goods were defective. In particular, it argued that they had been used for a use for which they had not been intended by the manufacturer. It pointed out that Mr P had said that he had used the graphics cards for a couple of years, and that he had only expected them to last a couple more years anyway, and so he would not be entitled to a full refund even if his complaint was upheld. It asked for an ombudsman's decision.

I wrote a provisional decision which read as follows. (This forms part of my final decision.)

[1] In fact they weren't. He bought them in September 2017, and complained in December 2020. The warranty period was three years.

What I've provisionally decided – and why

I've considered all the available evidence and arguments to decide what's fair and reasonable in the circumstances of this complaint.

Having done so, I am not persuaded that the graphics cards were defective at the point of sale, or that they were misrepresented. I will explain why.

The graphics cards were Nvidia GeForce GTX 1060 6Gb cards. These were launched in 2016 and, as I've said, purchased by Mr P in 2017. He says (and I accept) that when he began using them, their performance or hash rate was around 24 or 25 MH/s (megahashes per second), but that by 2020 this had declined to 22 MH/s, a rate which he described as unacceptable.

The reason for this, putting it as simply as I can, is that over time, the DAG file (software which is indispensable for mining cryptocurrency) incrementally increased in size until it eventually became too large for the TLB (hardware pertaining to each graphics card's memory) to cope with. This resulted in a significant decline in the speed at which the cards could operate, as measured by the hash rate. There is nothing the purchaser can do about this. As this was inevitably going to happen at some point, Mr P says that the cards were not designed to be durable (particularly since it took less than two and a half years).

Mr P also says that a similar problem developed with another kind of graphics card made by a different manufacturer. That other manufacturer developed a fix for that issue, but Nvidia didn't. Mr P argues that Nvidia ought to have foreseen that this problem would occur sooner or later, and so it should either have taken steps to pre-empt it or Nvidia should never have marketed its cards as suitable for crypto mining. (When he raised that matter with Nvidia in 2020, it told him that it could not assist him, and referred him to a forum for developers who were discussing the issue. I have looked at that forum, and I have seen a message there from Nvidia saying that they do not plan on doing anything about it.)

My opinion about all of this is as follows.

Firstly, I have not seen any evidence that C (the retailer who sold Mr P the cards) marketed the cards as being suitable for cryptocurrency mining. (I have looked at C's website myself, and it only mentions gaming, but I only attach limited weight to that evidence because the website might have been different in 2017.) On balance, I don't think there is enough evidence to prove that the cards were misrepresented as being suitable for the task Mr P wanted to use them for (assuming that they were unsuitable).

Secondly, I have seen a number of websites[2] which say that the standard hash rate of these cards at the point of sale is actually around 18 or 19 MH/s. This rate can be increased to 22 MH/s or higher by overclocking – that is, by improving their performance by increasing their clock rate to a higher rate than the manufacturer's design. So Mr P must have achieved his much higher hash rate by overclocking the cards.

There is nothing inherently wrong with overclocking, and many websites recommend it for a variety of reasons. However, the reduction of Mr P's hash rate from 24 or 25 MH/s to 22 MH/s, viewed against a standard (not overclocked) hash rate of around 18 MH/s, does not

[2] For example https://wccftech.com/nvidia-geforce-gtx-1060-cryptocurrency-mining-65w-detailed/ https://www.legitreviews.com/silent-ethereum-mining-evga-geforce-gtx-1060-22-mhs_195529 https://www.pyramidreviews.com/bitcoin-mining/gtx-1060-mining-speed-hash-rate-tweaks-and-adjustments/

amount to a defect in and of itself. The cards are still performing much better than the manufacturer designed them to.

Nevertheless, that point alone is not fatal to Mr P's complaint. The decline of the hash rate over time is still probative evidence of the alleged defect, as it could indicate that the hash rate would still have declined whether they were overclocked or not. That is to say, without overclocking, the hash rate might have declined from 18 or 19 MH/s in 2017 to around 16 MH/s in 2020. So this point is not determinative of Mr P's case.

However, I am not persuaded that a decrease of two or three MH/s is as disastrous as Mr P suggests it is. It is a decline in performance by, at most, 12% after over two years' of continuous use. That is not insignificant, but I still think it is relatively minor. I appreciate that it will be of great significance if it has resulted in Mr P's cryptocurrency mining becoming so inefficient that it is no longer worthwhile, having regard to energy prices. But I have already concluded that the cards were not marketed as being suitable for that purpose.

That links to my third topic. It is not possible to know very far in advance of time how much computing power will be needed for crypto mining to be profitable, as that will change from time to time. Just because it ceases to be profitable one day does not necessarily mean that the hardware was unfit for purpose all along. It is still mining. It may not be mining profitably, but that does not mean the graphics cards were defective at the point of sale.

Fourthly, the decline in the hash rate is not solely because of something internal to the graphics cards. There is an external influence. As I've said already, the issue is that the size of the DAG file has gradually increased over time, until it became too big for the cards to handle efficiently. But the size of the DAG file necessarily and unavoidably increases as a function of the process of crypto mining becoming more complicated over time. So this increasing complexity adversely affects the hash rate. This makes it difficult to infer that the declining hash rate means there is a defect in the graphics card. It is happening because each graphics card is having to do more than it had to at the outset.

This was always going to result in the DAG file becoming too big eventually. I agree that this was foreseeable by the manufacturer. But it was also foreseeable by anyone who bought it. It was necessary for consumers to buy a product which had not only the capacity to mine cryptocurrency at the time of purchase, but also with the additional capacity to continue doing so in the years to come. Every graphics card, not just Nvidia's, will become obsolete at some point (whether it is used for mining or just for gaming). So what was suitable for a given purpose in 2017 will not always continue to be suitable. I accept that Mr P believed that the cards would last him for five or six years. But just because he turned out to be wrong about that does not necessarily mean that they were defective. On the balance of probabilities, I am not persuaded that they were.

So my provisional decision is that I do not intend to uphold this complaint.

Responses to my provisional findings

The bank accepted my provisional decision. Mr P did not. He provided evidence that C had indeed been marketing the cards as being suitable for crypto mining (and I accept that this is true). He also made the following submissions:

- I had raised new points which had not been argued by the bank;
- Overclocking is normal in crypto mining (I accepted this in my provisional decision);
- I had confused the DAG file size with the memory limitations of the cards themselves and with an (alleged) defect in the TLB size;
- The real problem is an inherent flaw in the design of the cards, which took two years

to manifest and was triggered by the increase in the size of the DAG file;
- That design flaw is the limited size of the TLB buffer, according to an online article[3];
- This defect would still have affected the cards even if he had only used them for gaming, and not for mining;
- Nvidia has acknowledged that there is a problem;
- It is legitimate to compare Nvidia's cards with cards made by another manufacturer which don't have this issue;
- Without this defect – which was of course present at the point of sale – if the cards had operated at normal hash rates then he could have continued mining for about six years;
- A 12% drop in performance is not acceptable, and performance would have dropped by 20% by 2022;
- He had expected to get at least six years of use out of the cards, instead of two, and therefore he should get a refund of 67% of what he had paid for them.

My findings

I realise that Nvidia has acknowledged that the problem exists, but it has not gone so far as to concede that it is a fault. So I have still had to consider the evidence and decide for myself whether the cards were faulty at the point of sale.

Proceedings before the Financial Ombudsman Service are not adversarial, as in a court, where each party pleads its case and presents its evidence, and then the court reaches a verdict based only on what has been pleaded and led in evidence. Rather, our proceedings are inquisitorial, which means that I can consider evidence and arguments which have not been advanced by the parties. So I can consider points which have not been raised by Sainsbury's Bank – although everything that I said in my provisional decision was still related to the bank's defence that the cards were not defective.

I accept that if the limited size of the TLB buffer amounts to a defect, as alleged, then the cards would have been defective at the point of sale, notwithstanding that the problem did not become apparent until a couple of years later.

The message Nvidia left on the developers' forum reads as follows:

> *"We've confirmed that the performance drop is due to the size of the DAG exceeding the total on-chip TLB capacity … As a result, there is an increased number of TLB misses, which affects performance. Because the TLB is a fixed capacity hardware resource … we don't believe there are any software optimizations that could reduce the TLB miss rate.*"[4]

So although the issue described here concerns the TLB capacity, the problem is still triggered by the DAG file reaching a certain size.

As I explained in the fourth topic set out in my provisional decision, the DAG file was always going to reach a size at which the cards would cease to function properly one day. But Mr P's point is that this was not supposed to happen because of anything to do with the TLB, but rather because of another limiting factor – the 6Gb of memory on each card. Once the DAG file size reached 6Gb – the cards' maximum capacity – then it could not get any larger. Mr P estimated that this would happen after about six years, and he has no problem with that. But instead, the TLB acted as another limiting factor which made its effect felt much

[3] https://cryptoage.com/en/2824-the-reason-for-the-hashrate-drop-in-mining-on-nvidia-pascal-video-cards-gtx-1070,-gtx-1080,-gtx-1080-ti.html
[4] https://forums.developer.nvidia.com/t/blockchain-drivers/110847/14

earlier, and before the DAG file could reach the size the cards had been built to accommodate. And that would clearly be a fault, because it would mean that the cards would never reach their intended potential of 6Gb, due to a stricter limiting factor intervening.

As I have said, Mr P provided a link to an online article on the subject, which I have read. It is titled *"The reason for the hashrate drop in mining on Nvidia Pascal video cards (GTX 1070, GTX 1080, GTX 1080 Ti)."* However, the second paragraph says:

> *"It is worth noting that the hashrate decreases not only for the GTX 1070 video card, but also for the GTX 1080 and GTX 1080 Ti, although not so catastrophically. More interestingly,* ***no such problems were seen with the GTX 1060*** *and GTX 1070 Ti from the same 1000 series."* (Emphasis added.)

Since Mr P's cards were GTX 1060 cards, this article does not prove that his cards were affected by this problem. Neither does the Nvidia message I have quoted above, which was a response to a question posed specifically about GTX 1070 and 1080 cards.

That is not to say that Mr P has not been experiencing a decline in the hash rate of his GTX 1060 cards (and I accept that he has), only that the TLB is not necessarily the cause.

Another article[5] explains that a decline in the hash rate is to be expected when crypto mining with a GTX 1060 card, due to a different reason: insufficient VRAM memory in the card's GPU, which is the problem I described in my provisional decision. (That article then goes on to discuss TLB problems, but separately.)

So on the balance of probabilities, I am not persuaded that the issue is that the TLB was defective, but rather that the DAG file increased in size faster than Mr P had expected, which affected performance. And I am not persuaded that that is a fault which was present at the point of sale.

I am therefore unable to say that Sainsbury's Bank erred in its response to Mr P's section 75 claim.

My final decision

My decision is that I do not uphold this complaint.

Under the rules of the Financial Ombudsman Service, I'm required to ask Mr P to accept or reject my decision before 9 August 2023.
Richard Wood
Ombudsman

[5] https://www.techpowerup.com/234482/eth-mining-lower-vram-gpus-to-be-rendered-unprofitable-in-time?cp=2 (This mentions a GTX 1060 card with only 3 Gb of memory, but I expect that a 6 Gb card would be no different.)