US Semiconductors and Semi Equipment

Managing Through A Simultaneous Supply & Demand Shock; Highlights From CFO Expert Call

Equities

Americas

Semiconductors

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Conference call highlights

We hosted a call with Ernie Maddock, former CFO at Micron Technology (MU), Riverbed Technologies, and Lam Research (LRCX). He also ran Operations for LRCX during the '08/'09 financial crisis. Our conversation focused on challenges and pitfalls the current environment poses for the semiconductor industry. Despite a likely demand shock, this is different than prior recessions in that there is a corresponding supply shock. As such, Ernie expect the supply chain to remain generally tight and the penalty of missing a demand snap-back more severe than pulling on the supply chain and holding some excess inventory. Despite the uncertainty, our read-through from the call was bullish for both memory and the semicap sector. Highlights from the transcript are included below and a replay is available at +1 (617) 801-6888 (code: 63205949) until April 7, 2020.

Changing business dynamics given both a supply and demand shock

The industry has not had a supply and demand shock at the same time yielding many uncertainties for management teams. Demand side visibility is very limited but supply side constraints are clear; ergo, companies are not doing anything to slow down (order cancellations, etc..) and rather are more likely pulling more aggressively to provide comfort that near-term demand can be satisfied. This is different from prior recessionary periods where slack demand immediately cascaded through the entire supply chain.

Other financial commentary

Laying off employees is not likely since 1) companies want to retain goodwill of employees; 2) the labor market was very tight; and 3) barring financial distress, re-hiring is ultimately more costly than maintaining headcount that would be above optimal levels for even several quarters. Workforce retention will likely also be prioritized over stock buybacks despite many stock prices having come in significantly. Tapping revolvers and credit lines is very astute in this environment given low rates measured against the additional flexibility in working capital and downside from any future liquidity concern. Ernie views this as offensive move as much as a defensive one. Relative to what we might expect during earnings season, Ernie feels that, for some companies, the width of range necessary to cover the uncertainty might negate any value that would arise in actually providing guidance.

We present below highlights from our recent call with Ernie Maddock, former CFO at Micron Technology, Riverbed Technologies, and Lam Research. The opinions expressed by Ernie Maddock herein do not necessarily reflect the views and opinions of UBS. UBS accepts no responsibility for the accuracy, reliability or completeness of the information and will not be liable either directly or indirectly for any loss or damage arising out of the use of this information or any part thereof.

US Semiconductors

Moderator: Timothy Arcuri

Date: March 24, 2020 12:30pm ET

Coordinator Good day, everyone, and welcome to the UBS Expert Call: Navigating a Recession in Semis & Semicap - A Discussion with Ernie Maddock conference call, hosted by Timothy Arcuri. My name is Rea, and I'm your event manager. During the presentation, your lines will remain on listen-only. [Operator instructions]. I would like to advise all parties that this conference is being recorded for replay purposes. Now, I'd like to hand over to Timothy. Please proceed.

Tim Thank you very much. Hi. I'm Tim Arcuri. I'm the semis and semi-equipment analyst here at UBS. We're very happy to have Ernie Maddock with us. I've known Ernie for a long time. Ernie was the CFO at Micron from 2015 to 2018. Ernie was also the CFO at Riverbed from 2013 to 2015. And, Ernie was the CFO at Lam Research from 2008 to 2013. So, Ernie has been CFO in tech companies for a long, long time. I would also note that Ernie was VP of Ops at Lam from 2003 to 2008. So, importantly Ernie ran Ops during a very challenging period for Lam back in the 2008, 2009 period. So, very, very happy to have Ernie. Thank you, Ernie.

Ernie Good morning, everyone.

Tim I guess, Ernie, let's just dive into it. I guess first I just wanted to talk about the business dynamics right now and there's certainly very little visibility and there's a lot of fear about what's coming for companies in semis. Maybe, I'm just wondering, just to start with an open-ended question if you can talk a little bit about how you see things from your perspective and maybe what some of the challenges that are facing companies and CFOs right now and maybe what you'd be doing if you were running a company in semis right now.

Ernie Sure. I think there are two significant concerns that most companies in the space, across a wide range of the space, would have. So, in the first part, you're obviously grappling with impacts to the demand environment, which I don't even think we have begun to comprehend and I'm not suggesting that that means they are dire. I'm simply saying that events have been unfolding so rapidly that a company's ability to have a realistic assessment of what might happen in the demand environment later on, they're still developing that.

Secondly, given all the supply chain disruptions, you are simultaneously trying to figure out what your capabilities in terms of production and what your supply chain looks like. So, there's a fair parallel between what we have all been personally experiencing as we've gone to the grocery store and what executives in these companies are facing right now, which is on one hand the experience has been that their supply chains have been disrupted.

Even if you believe from a prognosis point of view that there is going to be a demand impact at some point in the future, right now you are likely so concerned that you will not be able to supply near-term customer orders, have a supply chain that remains intact, that it's very likely that you are not doing anything to proactively slow down your supply chain currently. You're probably doing just the reverse of that which is you want to make sure that you are pulling on your supply chain to the fullest extent that you can so that you at least are comfortable that near-term demand can be satisfied.

And, particularly if you're in the semicap space or on the other side of that you're a device manufacturer who is consuming stuff coming out of the semicap space, all of the equipment that you are acquiring in say 2020 is really to position yourself for 2021, maybe the latter part of 2020. And so, it's interesting and unique times despite the fact that I think we are all extremely concerned about what the future might hold.

The short-term implications and the short-term actions that are likely being taken inside these organizations is actually to make sure that the supply chains are as robust as possible. And so, other than supply shortages that might exist as a result of workforce disruptions, etc., you're actually going to see normalcy here in the short-term as companies pull on those supply chains and then if there is a longer-term impact to the shutdowns and things, you're likely going to see that further out than you might in other industries which are experiencing the immediacy of this, the service industry, hotels, etc. Semiconductors, I think what's going to happen is folks are going to consume as much of the supply chain as they can here in the short to intermediate term and then as things begin to recover and there is a better view of what disruption on the demand side might actually be, companies will start adjusting and recovering then.

From a purely financial point of view, some fairly strong balance sheets, obviously, and I know across the industry from the contacts that I have and press releases what you've seen is people draw down lines of credit to make sure the cash balances are strong and sufficient during this time. And so as a result of that, I think there is fairly strong balance sheet, little risk of disruption in that regard. I think the industry will have the liquidity necessary to deliver on this scenario that I've just described.

Tim: Got it, Ernie. Thank you. A lot of things going on right now for sure. I guess that leads into as we get to the end of the quarter here and companies are going to have to start to guide and provide some guidance for June, as a former CFO, how would you think about guiding in this environment? Certainly the supply side you can handicap because you have some visibility on that but the demand side you really seem to not, based upon what you just said. So, how do you guide? Do you guide to what you—do you take a view on demand? Or, do you provide an extra big range in this environment or do you even say I think it's going to be X and I'm going to guide to 70% of X? How do you think about that?

Ernie I think that might be slightly different between say a semicap company and a device company. On the semicap side, there is a lot of visibility and always has been a lot of visibility into what your supply picture looks like. And so, if you accept the hypothesis for a minute that device manufacturers, whether they be memory or logic, are not canceling orders with the semicap guys, which we'll wait and see if that occurs, but I doubt that is occurring right now in this time of uncertainty—it's probably the reverse—then, the semicap guys are going to have clear view based on their unique and individual circumstances of what their supply can look like.

Obviously Lam has come out and withdrawn its guidance as a result of some of the shutdown measures that are in place. We'll see how long those sustain but I would think that from a semicap space it will be your supply side that will fundamentally dictate how you might guide, and irrespective of that fact, you may choose not to guide just simply because of the level of uncertainty that we have or you would guide with wide margins.

At a personal level, I think if I were sitting inside one of these organizations with something like a really wide range of possible outcomes from these shutdown and isolation activities, I think it's reasonable to consider not delivering formal guidance but simply to say here is a potential range of outcomes but make that at a lesser degree of formality than guidance. Because ultimately, if you guide to a range of 50%, that's not really guidance at all. That's something very different than what we're akin to. So, I think there's a real chance that we're going to hear companies either very much widen up the range of guidance, which negates the idea of guidance for its purpose, or simply say, listen, we're going to give you some information, it does not have the formality of official guidance on behalf of the company but here's some range of outcomes.

Tim Great. On the semi side, I mean, obviously it's a little different, the supply chain is a little more diverse and not as concentrated. So, maybe that's not as much of a problem in semis. Can you also make the same comment in semis as well if you had to guide in this environment?

Ernie I think in the semi space, depending, I think in the short-term, folks will have some measure of supply concern because even though there is more concentration and certainly a lot of that activity is occurring in parts of the world that are "opening" back up a bit. The latest seems to be Malaysia right now where commerce there came to a halt. It is opening back up but you're just going to have a shortage of workers. You have that same supply issue that you have to think about and understand.

But then, on the demand side, it's hard for me to imagine here at least again in the short-term that you're going to see a lot of customers canceling their orders because the last thing they want to do is find out that this thing recovers more quickly than we expect and they find themselves cut short. They've come off a period of time in 2017, late 2016, and 2017, where they experienced the pain of that. And so particularly while the pricing environment is not terribly oppressive to them, it's likely that in the short-term they're going to continue to accept some level of output from the device manufacturers. We've all heard about data center robustness and certainly we can envision that technology solutions will be an integral part to addressing the crisis that we're currently in.

So, I think being able to the guide in the short-term is honestly going to be less of a challenge than many guiding and thinking about things like annualized bit growth if you're in the memory space or aggregate demand growth over a period of 12 months. Shorter-term guidance will actually be easier to provide. I would still say there's a case to be made for taking a quarter off providing formal guidance, but at the very latest what you're going to see is companies either give you a very wide range of guidance, probably double or maybe even 2.5 times the normal range, or being extremely conservative in their guide and then beating it.

But it is an unprecedented time because you have both dynamics, the supply side and the demand side, that are more difficult to predict than they have ever been before. And so, if I were inside any company right now in this space, I would probably be arguing very strongly giving that there's some of possible range of outcomes but again to not have that rise to the level of formal guidance.

Tim — Got it. And then, maybe if we can just talk about the memory industry just for a second. You've known the industry for many, many years and so you've seen the ups and downs and what drives demand. What's interesting right now seems to be that pricing is pretty good. I mean, contract pricing is certainly good, headed into June quarter for most companies. But, bit growth is very, to your point, pretty unpredictable, data centers obviously still very strong.

How do you juxtapose—I've been getting this question, well, pricing is only going to remain strong in as much as bit growth remains strong. So, pricing is a little bit of a line indicator at least given this current situation. Can you just talk a little bit about how you think about the dynamics and the plusses and minuses and the pushes and pulls right now in the memory space?

Ernie — Sure. I think you have to look NAND and DRAM discretely in this environment. We entered the year, I think, with suppliers actually doing a phenomenal job relative to managing supply growth in 2019 and 2018. It wasn't the best of times but same token, the level of industry profitability as you went through that cycle was at record levels for a downturn type of environment.

The supply growth was well-managed and as a result of that, the supply growth can continue to be metered throughout the course of 2020. Even though you might have customers accepting tools and wanting to make sure that they are positioned effectively, they can always, like they did in 2019, slow roll the installation of those tools and slow roll the ramping of that capacity to be able to respond to a very volatile demand environment. Unless you have a mind-set that you will actually see 0% bit growth on the demand side, I think the suppliers have a fairly good chance of being able to meter demand to be consistent—I'm sorry, meter supply to be consistent with what they would expect demand to be because essentially they entered the year in an equilibrium or maybe a slight deficit of supply growth relative to the demand side.

So, it doesn't feel to me as if there's going to be an environment where people are going to be very aggressive about adding supply in the face of an uncertain demand environment despite the fact they may position themselves by taking tool deliveries and continuing to do preparation work to be ready for that. The biggest part of the demand that is going to be impacted are going to be things like [indiscernible - 45:02] demand, automotive demand, things that are more oriented around consumer spending as opposed to data centers which comprise still a significant portion of demand.

So, even if you assume that these other areas are flat or potentially negative to last year, the demand growth coming out of the data center will likely still create a positive demand environment growth for DRAM bits and therefore I think the suppliers will be able to meter that without driving the market into significant imbalance as a result of that having some pretty negative repercussions. Now of course if we really do enter into a period where you have extraordinarily protracted demand constraints or demand fall-offs that will ultimately have an impact but the most important thing to remember from a longer-term perspective is as long as supply growth can be mirrored to meet whatever the demand growth will be, it will create an opportunity for suppliers to have reasonable profitability throughout the course of that. But I would argue that even in 2019 the vast majority of DRAM suppliers actually had reasonable profitability.

That's a view on DRAM. I think NAND, on the other hand, the positive is there is still positive demand drivers. The same data center that's creating DRAM demand will create demand for SSPs, which will consume a lot of NAND. But, NAND is more reactive to consumer type orientations around cell phones, smartphones, tablets, other things so there's a bigger chunk of that NAND demand that is more oriented on the consumer side, and so therefore, that demand picture probably doesn't look quite as solid and on converse, the technology progression is still at the point where you are getting meaningful number of new bits from each technology transition.

Certainly, it has declined from the first couple generations of the 3D NAND transition but compared to DRAM supply growth of 10% to 15%, you're still going to have NAND supply growth that's going to be a good 25%, 30%, pick a number that you're comfortable with. And, in the face of a demand environment that is probably more impacted by general economic conditions than it is simply by data centers that could be a bit of a rockier segment.

Tim Got it. Thank you, Ernie. Maybe let's roll into a couple of finance-related questions. I guess, in semis, as a CFO, how did you think in terms of logistically how you're going to manage opex today? Would you be furloughing employees at this time? Would you be eating it? For example if you had some supply constraints that were constraining your production, would you furlough employees? Would you pay them during this period? How do you think about that where the pain point is where you would have to actually cut opex?

Then I guess also that point, I wanted to get your view on stock buyback because you would think that now is the time that companies would be amping up repo but then I've gotten a lot of questions this morning about Intel curtailing their share repurchase. I just wanted to get your opinion also on share repo.

Ernie Yes, interestingly, if you look at most semi companies, the vast majority of their pure opex is going into R&D efforts and to sales and marketing efforts. Very little of them are G&A related. It's kind of hard in terms of would you do a vacation shutdown. The industry is famous for this where you take two weeks at Christmas or whatever to respond to that to try and at least control opex in that regard. For sure you will likely consider those sorts of actions.

Would you actually think about laying off or furloughing in a more serious way? I think the likelihood of that is relatively lower because listen, if you're sitting inside a memory company, you're working on 132-layer, 164-layer 3D NAND, you're working on 1Z or beyond 1Z DRAM, and those are not efforts that you want to curtail because that's the key to future cost competiveness and your future cost structure. If you're inside a semicap company, you're working on the equipment that's going to enable all that stuff to occur. And so, the likelihood that you would choose to do that, particularly when your balance sheet is strong and you have cash reserves, you would likely probably not think of that as a first go-to.

What you might do is furlough some of your—the employees who get classified [indiscernible - 50:53] because if you have issues with your supply chain that are unique to your company and you know that for a period of time you're not going to be able to produce, would you think about some action there of a temporary nature, you might. Then that brings in to call your second question which is well would you choose to pay folks?

I think that certainly here in this period of uncertainty you probably would choose to do that because, one, it's a socially responsible thing to do. Secondly, you want to retain the good will of those employees. Now, would you maybe ask them to take some of their vacation time or something? Sure. But, that's in the weeds relative to how you think about that financially. I think 30 to 60 days from now, when folks really begin to more fully comprehend the longer-term demand impact, might you see some changes? It's possible.

It does dovetail into the second piece of your question. So, if I had a choice between retaining the workforce and having cash available to do a share repurchase, I would always err on the side of retaining my workforce because until you believe that there is a fundamental long-term structural change to the business that you're in, I think the semi industry in general has learned that the idea of hiring and firing is just very unproductive and ultimately does not generate financial returns.

Is it tempting to go do a share repurchase? Absolutely. This is the moment that, if you're in a cyclical business, you've been waiting for but let's put things into perspective. Semi companies are trading today at or near the levels they were at the end of 2018, roughly. I'm very familiar with a few of them.

And so, in 2018 what folks were worried about was the Chinese tariffs and so you had good balance sheets, you had a good economic situation and people were worried about the Chinese tariffs. Well, look at the level of repurchase activity that occurred there, which some did but it wasn't extraordinary. Companies didn't use 100% of their allocation or even material portions of that in that time.

You'd be less likely today to do that because while the stock price might be as or more attractive, the economic uncertainty is an order of magnitude greater than it was back in those days.

Tim Got it. That's great. Thanks. I guess one more thing we've seen—I'll ask you a couple more questions and then we can open up the lines. I can keep on asking you questions for a long time. We've seen a couple of companies file that they are drawing down credit lines, both of your former employers, yesterday, filed that they're drawing down their credit line. This is usually not a good sign but of course the commercial paper market hasn't been working very well right now either.

Can you talk just generally about what you read into companies with optically good balance sheets that are actually drawing down their credit lines?

Ernie I would read into it that they have some fairly astute managements and leadership. I think you want to have as much flexibility as you can have during these times and drawing down these credit facilities while they're available because no one knows if in six months there's going to be a liquidity crisis or something. The choice you face is well, do I draw this down, take some interest, which is relatively modest, but know that I have an extra X-million, billion dollar credit facility available to me and I'm improving my cash position. That's just the smart thing to do.

And I'll tell you, I have a lot of personal contacts who are actually replicating that personally, where they're looking at this in the face of a tax season that wasn't extended until a short time ago. They're thinking about it in exactly the same way. I'm going to draw down a credit facility I have as opposed using depreciated assets to deal with the liabilities I have. So, I think that's actually a brilliant move and would be encouraging the same to any company that has this available to it.

Tim Got it, Ernie. Thank you. Maybe we can turn it over to the operator to see if there's any questions on the line and if there's not, I can keep on asking questions. Let's see if there are any questions out there.

Coordinator Thank you so much. Everyone, your question-and-answer session will now begin. [Operator instructions]. The first question is coming. Please proceed. Your line is open.

Caller Hi, thank you. Just following up on the last question. Do you think there are any more signatory [ph] issues for why you would draw down your credit lines? Are there any exploding balance sheet problems, inability to collect receivables, payables being accelerated? I would not think so but what would you see?

Ernie I think the likelihood that there is some unspoken negative motivation for doing this is actually pretty low. And so, I think this is much more a defensive—well, an offensive move to position yourself as defensively as you can.

Tim Maybe as we're waiting for people to queue up, maybe, Ernie, we can [audio muffled - 57:52]. Can you just talk about if you play this out how do you see things coming out of this? I guess I'm particularly curious about your thoughts on memory because it sounds like what you're saying on the supply side that it could actually, in your eyes, make the recovery as you look out a year or two possibly even stronger from a pricing perspective. Is that the right read?

Ernie I would say certainly a very low likelihood in DRAM of an extremely negative pricing environment. Any time they're trying to match supply and demand it's an imperfect process but as we saw in late 2018 and 2019, each supplier took actions in some cases which were never, never taken before to really make sure that supply growth was matched to or contained to address the demand environment. Were it not for the inventory situation that existed as a result of the feeling of shortages that people had in 2018 and 2017 the likelihood is that it would have been an even shorter duration downturn and in fact the pricing environment would have improved sooner.

So, we're now at the case where there isn't this wide band of inventory in the ecosystem. Inventories have returned to normal. There will be some supply growth as a result of technology transitions. Those will yield probably in and of themselves in the course of 2020 that might be middle to upper single-digits in terms of bit growth that would just naturally be the impact of implementing new technology. And then a lot of the equipment deliveries are to either get that mid to upper single-digit bit growth or in fact add or restore some capacity that's taken away by the tech transition to move you up above that 10% and into the middle teens level.

There is a lot of flexibility right now on the part of suppliers to look at how they want to increase their bit output on the DRAM side. And so, if you assume that there will be some impact from this over the long-term, they have a fair amount of control right now around how bit growth expands. And, as we all know, there is a relationship between supply growth and demand growth, so if they can do a good job keeping supply growth in line with demand growth, you have the best opportunity for a good pricing environment and good profitability.

Good to me is not defined as 80% gross margin, which is what we saw for some of the leading producers in the height of the imbalance. But will you have healthy profitability in the DRAM business? Absolutely. The NAND side of the house I think is, as I said earlier, it's a bit of a different equation and I think that will continue to be more challenging to balance supply and demand, given what's happening on the demand side maybe being a little more impacted by consumer-oriented behavior and then the supply side being impacted by the fact that these tech transitions from 96-layer to 128 or 132, whichever an individual supplier, that's still going to yield significant bit growth.

You'd literally have to slow the tech transition to moderate bit growth and of course that's a bit of a prisoner's dilemma because if you slow bit growth you slow your cost reduction. If you look at some of the comments that Micron in particular has made, they've said that in 2020 they are planning to change their technology basis of their NAND, so they're not going to have a lot of bit growth anyway, so you'd be looking at these other suppliers and them slowing down their transition to whatever the new tech node is. That's a harder set of economics to execute on.

Tim — Got it, Ernie. Thanks. Let me just ask you one follow-up and then we can go back to the lines. Just on that point, as you look at how this could transpire during the next upturn, do you think it's plausible, given what you're saying about DRAM, and this is a difficult question to ask right now, that coming out of this, if you look out a year or two, that given how focused the data center guys are even today on procuring DRAM, is it possible that the memory companies can go to the hyperscale companies in particular and require prepayments for them to go out and basically invest capex? Is that a scenario that you think could actually transpire during this next upturn?

Ernie — I think that would be an extraordinary situation and one that I can't envision. There are a lot of steps that you would go through before you got to that level. That would represent a sea change in the dynamics, the relationship dynamics between suppliers and customers.

Now, would you ask for and could I contemplate some commitments, more firm commitments that then tend to exist in the industry around the acceptance of supply? Can I envision that? Yes. To get to the level of requiring prepayments for capex that seems much less likely to me.

Tim — Got it. It makes sense. Let's see if there's any questions on the line.

Coordinator — Yes, we do have questions. Please proceed. Your line is open.

Caller — Hi, thanks for doing the call. I appreciate it. I think, Ernie, you described it pretty well saying it's unprecedented to have a supply and a demand shock at the same time. I guess I have a supply and a demand question.

On the supply side, given you've worked on both sides of this, can you just talk a little bit about how important it is to bring engineers from the semicap side onsite to the fabs in memory in terms of installing tools? Are there any tools that require more handholding or less handholding? Is it more impactful on greenfield or brownfield? Is there any color you can give to that? Because, we're obviously seeing a lot of travel restrictions.

Ernie Typically the most important interface that exists between say engineers in the semicap company and engineers in a device company relate less to volume manufacturing than they do in terms of rolling out new technology. So, as company X considers the newest technology node, while that node is being developed, there's going to be a fair amount of intensive interface between the equipment suppliers and the device makers relatively to how to utilize the equipment to produce that process result and whether or not process that the device makers designed to be tweaked a little bit, etc.

So, by the time you get into volume production, most of that interface is in fact now focused on whatever is next and really you're dealing with the service engineering teams of the equipment guys coming in to the fab to install and maintain. From a real product engineering point of view, there will be a huge number of product engineers from say a Lam or an Applied going into a fab to address production issue.

But, certainly, you're going to have to come up with new and creative ways to get this interface done on new technologies. The good news there is that for US-based companies so far there are fewer travel restrictions. Although, there are still significant ones that are imposed by each of these companies. But, there are ways of dealing with that that rely less on in-person interaction as opposed to just having the ability to video conference or chat and certainly there will be some impact but it's not dramatic because the equipment engineers or the engineers from the equipment guys are not the people implementing the tools in a production environment.

Caller But, do you think it could slow a migration from let's say 1Y to 1Z or 96 to 128?

Ernie It's possible that it could but I think this would have to be a very protracted—certainly if you say, well listen, things are not going to get any worse than they are today, I think the likelihood of that slowing is pretty low. If things get much worse than they are, if we go into a lockdown for 30, 60, 90 days, would that potentially have an impact? Absolutely. But, I don't think we're there yet and I think it would have to be very, very significant in terms of duration of time to have any measurable impacts on the rollout of those new technologies, based on my experience.

Caller Got it. Thank you. And then a really quick one on demand. You mentioned just the short-term impact as people want to shore up their supply chains and probably order as much as they can to make sure they have supply. As a memory CFO, how would you monitor customer inventory builds or potential for hoarding or double ordering? Anything you think that you would do? Has the industry changed at all in its ability to monitor that?

Ernie I didn't mean to leave you with the impression that there would be—there might be some hoarding tendencies but I was simply trying to say, listen, we're sitting here in late March, early April, you have some idea of what you think you're going to be delivering certainly over the next 30 days and likely on a memory side over the next 60, maybe as much as 90 days. I was trying to make sure that people understood but from my perspective you're not going to see a lot of mass cancelations of those orders. Customers aren't going to take a decision to cancel them.

What they would likely do is moderate in the time period beyond 90 to 180 days and take the approach, well, I can afford to bring this in. The future is not certain to me, and so I'm going to err on the side of caution and at least have the inventory that I wanted to have and then I have the ability on a going forward basis to adjust. So, I think it doesn't feel to me as if hoarding is in order. I was simply trying to share a view of the reverse of that, which is I don't think there's a likelihood that people are going to refuse to take orders because they simply don't know what the future looks like.

No one believes, I think, that the future is going to be better than we thought it was going to be. If anything, an optimistic person would say, well, we're going to get through this and things are going to go back to normal. A pessimistic person is going to say, well, probably going to take longer to work through this than we might think.

So, if you're sitting inside a consuming company, an Apple, or whatever, the first thing you want to understand from your suppliers is, what does your supply chain look like? Micron or Intel, what does your production situation look like? And, if what you hear from them is, listen, we are very comfortable that we are going to be able to quickly restore our productive capabilities, then you're going to not be very inclined to double or triple order. If what happens today in earnings, if Micron comes out and says, listen, we're shutdown, which I don't think they will based on all the information that's been coming out of the company, then you might try to pull some shenanigans to protect yourself. Again, very analogous to your personal situation at the grocery store. You're not going to buy extra if you know that it's going to be there when you need it.

Coordinator The next question is coming. Please proceed. Your line is open.

Caller Thanks for this. When you talk about not canceling orders with some of the semicap equipment guys, can you just talk about a little bit more detail, the puts and takes, on how do you then prepare for the uncertainty of demand for the second half of this year and into next year? Thanks.

Ernie Sure. If you look at the average equipment, the interface between the device manufacturers and the equipment guys, typically you would provide a rolling forecast from a device manufacturer into an equipment manufacturer. And then, that forecast becomes solidified as you enter into the time periods that are essentially the lead times of the equipment suppliers. And, when you have very robust times—historically when I was the CFO of Lam in a very robust cycle, you would have six- to eight-month lead times. Customers would know that they would have to commit to taking deliveries in that time frame. The supply chains have improved right now and so the frozen period, if you will, is probably a quarter or so. And, even within that, if you're a good customer to Lam, Lam is going to allow you some flexibility.

So, I think that there will be ample time in two quarters or three quarters to adjust whatever you believed was going to occur over that time period versus the reality that you now believe will occur after you have figured that out. The way I would approach it if I were on the consuming side of the fence, so if I were in a device company, I would likely want to make sure that what the company was focusing on is what we believe the change to our medium- to longer-term demand scenario was going to be as opposed to whatever we were bringing in over the next quarter or so.

Let's face it, even big companies what they're going to get in the course of any given quarter is a couple of billion dollars, and I'm not making light of a couple of billion dollars. But, in the context of the balance sheets we're talking about here, that's not a make or break decision, especially when you have some amount of leeway over a longer forecast horizon to adjust your thinking a little bit. Does that make sense?

Caller — Yes, it does. Thank you very much.

Coordinator — The next question is coming. Please proceed. Your line is open.

Caller — Hi. You already touched a little bit but maybe I'll ask again more detailed. Do you expect big shifts on the roadmaps, beside some minor shifts of course if people are not able to go into work, but okay you can do a lot of [indiscernible - 75:42]? Will there be major shifts or they will stick to it?

Ernie — Well, certainly in the memory space, the progression down the technology curve is an integral part of cost reduction and so there is a lot of motivation to continue down the roadmap, the technology roadmap. While there might be some small changes as a result of disruptive activities, even in the face of a demand environment that might look softer, it would be a really hard decision to postpone the implementation of that because that will lower your cost structure. And so, you might consider doing that if the resulting reduction of your cost structure—which is symbiotically tied to an increase in bits. The only way you reduce your cost structure is to increase bits.

So, if you thought that the implementation of the next technology node was going to generate bit growth in excess of what the market demanded—and therefore essentially you'd perform a calculation and say, well, great, will the lower cost structure plus the damage to the pricing environment, how does that all pan out? Is that net-net profitable or net unprofitable? That would be the math that you would go through in your mind and it's hard to envision that you would make a deliberate attempt to differ the implementation of that. You might roll it out more slowly in production. A number of things you can do.

But, you're probably not going to delay getting the technology done because if you do that, and things improve more rapidly than whatever your frame of mind is relative to the future, at worst case, you're probably going to drive it and put it on the shelf a little bit if you think implementing it would be financially disadvantageous given the demand environment. But, you're not going to slow down the development because you really want to get that done to get that learning behind you and maybe move on to what's next. So, I think the likelihood of that is small.

If you're a GSMC, etc., they're responding to what their customers are telling them and that would get down to your core belief about whether the NVIDIAs of the world and the Broadcoms of the world are going to slow down their innovation or that their innovation might be slowed down as a result of this. Again, unless you are of the school that says this is going to be very protracted and it is essentially going to be, I don't way to say—I'd say, beyond a couple of quarters, if you believe there's going to be a depression, essentially, it's hard to imagine that you would stop that innovation because there is a piece of that innovation that's core to addressing some of the problems we're currently facing.

You start thinking about how people are talking about containing this or other similar situations. And, you think about the massive data that would be required to be collected and managed. Technology is going to be an integral part of making those things feasible.

Coordinator The next question is coming. Please proceed. Your line is open.

Caller Hi, good afternoon. I have three short questions if I might. One I was wondering if you know that pricing is being taken monthly or quarterly, currently, considering the demand situation. Two, I was wondering if you could speak about EUV in the architecture, like why hasn't Micron adopted and why are they a late adopter? If you could speak to that. And just if you could speak to the application set for 3D XPoint, when you see that taking off. Thank you.

Ernie I'm not going to answer why Micron isn't using EUV. That question actually should be directed to Micron management. It's not appropriate for me to opine on that or opine on 3D XPoint.

As a general statement, I would say that, and I'll repeat what Micron has said publicly, they have not eliminated EUV as a possibility in their roadmap. They simply have developed their node technology in such a way in the math that any company does. Whenever you're developing a new node, what you think about is, what's the cheapest way to deliver this node? And, in the math that any company goes through, if they can deliver the node more cheaply without using EUV than with EUV, that would be the prudent course of action for them to do. So, I think it's potentially not the right reference to say that they're a late adopter, as if late is bad. The answer could be they've figured out something technologically that no one else has and therefore can proceed further without it.

That's the end of my comments about specifically Micron and EUV and I'm not going to comment on 3D XPoint. I think Sanjay has publicly talked about those topics.

Your third question, which I don't quite remember, can you ask that again?

Caller: Whether people are—sometimes the contract negotiations happen monthly, like in tighter environment quarterly. What have you heard or what have you seen in terms of the DRAM world? What's the state of affairs currently?

Ernie: We're probably, if we all step back away, a month to five weeks into the realization that this thing is as big as it is. I think that's too short of a period of time to make any prognosis about what the impacts will be in terms of specific contract lengths and those sorts of things. As I said earlier, I think in the short-term, you have an impact on both supply and demand but I also think in the short-term, folks are going to try to stay whatever course existed just because they don't have enough information right now to appropriately address the risks that are inherent on both sides of the equation. My guess is, and I don't have any insider information, but every data point that I have collected suggests that at least for the moment it's more likely that it's business as usual [audio drops - 83:42].

Coordinator: The next question is coming. Please proceed. Your line is open.

Caller: Hi, can you hear me? I don't hear Ernie or anyone.

Coordinator: No, he has not dropped. His line is still on. I don't know what happened but I still can see his line.

Caller: Ernie, are you with us? I guess not.

Tim: Let's just give him ten seconds to see if he comes back. If not, we'll just wrap it up. We're getting to the end anyways.

Well, I think Ernie dropped off. We're getting to the end of this call anyway. Sorry, we couldn't get to the last couple of questions but I really appreciate everyone dialing in and [background noise - 85:14] to me and I can try to respond and I can see if I can get a response from Ernie as well. Maybe we should best just leave it there, unfortunately. I really appreciate everyone's time for dialing in.

Tim: Thank you for the call everyone.

Coordinator: Thank you, Timothy. Everyone, that concludes your conference call for today. You may now disconnect. Thank you for joining. Enjoy the rest of your day.

[END OF CALL]

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