

**Exchanges at Goldman Sachs**  
**The Delta Variant: Implications for Vaccines, Booster Shots and**  
**Economic Growth**

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**Recorded: August 4<sup>th</sup> and 5<sup>th</sup>, 2021**

**Allison Nathan:** This is Exchanges at Goldman Sachs, and I'm Allison Nathan, a senior strategist in Goldman Sachs Research.

In this episode, we're going to discuss the Delta variant and how the fast-spreading virus is affecting the path of reopening and economic growth more broadly. To do that, I'm sitting down with my colleagues in research Terence Flynn in our health care group and Daan Struyven from our economics team.

We'll first turn to Terence Flynn who covers the US biopharma sector in GS Research for his thoughts on the Delta variant and vaccines. Terence, welcome to the program.

**Terence Flynn:** Thanks so much, Allison. Really appreciate the invite.

**Allison Nathan:** So the Delta variant seems to be driving yet another wave of coronavirus cases. Obviously the news is dominated by the spread of it. So just to start, why is the Delta variant so worrisome?

**Terence Flynn:** Sure. So as most people know by now, the virus changes over time. And there have been a number of these different variants that have arisen over the course of the pandemic. Delta is obviously the latest one. And the thing about Delta is it's more transmissible. So it basically has the ability to spread much more rapidly. And so, for example, when a person's infected with Delta, they can infect a greater number of people than a person who was infected with one of the earlier strains of the virus. And for this reason, it's why it's become the predominant strain around the globe.

This also means that you could become infected during a shorter period of exposure. And so that really relates to the fact that Delta leads to higher levels of virus in people. So as a result, even if you come in contact with someone who has the Delta variant and you're not vaccinated, you can become infected over a very short period of exposure versus some of the prior

strains of the virus where it might take longer for you to become infected.

So those are two of the reasons. The third one essentially relates to something that relates to the vaccination. So even if you're vaccinated, people are able to spread the Delta variant. And that's a little bit different from before with some of the earlier strains of the virus where, if you were vaccinated, it was very unlikely that you would be able to spread the infection via an asymptomatic infection. So some differences here with Delta, and that's why there's such a big focus on that now and the reason why it's spreading so rapidly.

**Allison Nathan:** So what do we know about how well the current vaccines hold up against the Delta variant?

**Terence Flynn:** It's obviously a great question, very topical. I mean, we're fortunate to have vaccines now at this point in the pandemic. So I'd say just to level set, to remind people here about some of the differences when we talk about protection, remember, there are these asymptomatic infections. So those are essentially you have the virus in your body, but you don't show any outward symptoms. You can't really even tell that you have an infection.

Then there are symptomatic infections. So essentially that's what's referred to as COVID-19 or the disease that the virus causes. Those are feverish symptoms. You feel bad for a few days.

And then there's severe COVID-19 disease. Essentially the disease that could lead to hospitalization and poor outcomes. So essentially it's a spectrum. And so I'll talk a lot about the efficacy first about symptomatic infections, and then we'll go onto severe disease.

But I think now we do have a lot of real-world data that are emerging from a number of different countries. Bottom line is the vaccine protection and still very robust after double vaccination. So if you've gotten two vaccinations, you're in pretty good shape in terms of protection against Delta. But if you've only had a single vaccination, the protection levels are much lower.

So, for example, there was a study that was done in the UK where they looked at the Pfizer BioNTech vaccine. Showed 88% protection of symptomatic COVID-19 after your second dose

against the Delta variant. Now, if we look back to the earlier time point in the pandemic where we had the Alpha variant that was spreading, efficacy of this vaccine was just over 90%, 93%. So not a big change there in terms of efficacy. But if you look at single-dose vaccination, the efficacy against Delta is only about 30%, so a big step down there. So again, very important for people to be double vaccinated to get that protection against Delta.

Now, there is some more recent data that emerged out of Israel, and this shows that there even after double vaccination, the efficacy against symptomatic COVID has pulled back to about 40%. So that's in contrast to that 80%-plus figure I cited previously out of the UK. Now, one of the questions is maybe this has to do with the time frame of vaccination. As many people know, Israel was at the leading edge of the global vaccination campaign, and so there could be some of a waning effect of the vaccines over time. And so that's one thing that, again, the companies are studying. We're gathering more data on to fully understand that.

Now, as we shift to look at severe disease, remember, as I mentioned before, this is a spectrum, right? So again, here importantly I think the message is the vaccine efficacy against severe disease and hospitalization is still around 90%, even with the Delta variant. And that comes from some data out of both Israel and Canada. So that's very encouraging.

And so bottom line is if you're double vaccinated, have very good protection against Delta, especially against severe disease and hospitalization. And that's obviously a big focus of the health care system because when we talked about these lockdowns and different measures that countries are taking, it relates to really trying to preserve that health care system capacity. And so given the vaccine efficacy we're seeing here out of Israel and Canada, very encouraging protection against severe disease.

**Allison Nathan:** Let me just follow up there because obviously we have Pfizer, we have Moderna, we have other vaccines around the world. Are there any very material differences between these vaccines?

**Terence Flynn:** So I'd say bottom line it looks like the messenger RNA vaccine -- so Pfizer, BioNTech, and Moderna -- are somewhat better than the adenoviral vaccines, those from AstraZeneca and J&J, for symptomatic COVID-19. So again that kind of symptomatic disease. But all four of these vaccines

look to be very, very good against severe disease and hospitalization. So not as much of a difference there. And remember, that's the big focus of the health care system is ensuring that we're protected against severe disease and hospitalization. So less differentiation among the vaccines on that front.

**Allison Nathan:** We're hearing about the severity of illness for breakthrough infections, so meaning vaccinated people getting the infections is actually lower. Is that true? What does the evidence say around that?

**Terence Flynn:** Yeah, obviously another very important topic here, and everyone's probably seen a lot of different headlines on this. So, look, you know, vaccine breakthroughs are still generally rare but unfortunately they do happen. Now, the flip side of it is if you do have a breakthrough infection, the symptoms and duration of illness is likely much less severe than it would be if you aren't vaccinated. And there's some data that's emerged on this front from earlier in the pandemic that suggests if you do have a breakthrough infection you still have about 60% lower flu-like symptoms than unvaccinated people and about two fewer days spent in bed versus someone who's unvaccinated. So bottom line is still very rare to see breakthrough infections, but if you do have a breakthrough infection the symptoms are much less severe.

And again, I want to stress that these vaccines do a very good job against protecting against severe disease and hospitalization. And there's some recent CDC data out on this front that's been collected in the US through the end of July. So basically more than 160 million people in the US have been fully vaccinated. Now, during that same time, the CDC has been collecting data on hospitalization and breakthrough infections. And essentially over that time about 6,600 people have had a breakthrough infection that led to hospitalization or death. So 6,600 out of 160 million people. So very, very rare to see these severe breakthrough infections.

So bottom line is the vaccines work very, very well. Breakthrough infection can happen, unfortunately, but the vaccines do a great job at protecting against the most severe outcomes.

**Allison Nathan:** We're also hearing a lot about booster shots. So should individuals be getting another dose of the vaccine heading into the fall and winter? So what's the latest on that?

**Terence Flynn:** Yeah. It's a very important question and an evolving topic here that we're following very closely. So I'd say just to start at a high level, there's two reasons why boosters might be needed. The first is waning immunity. And so that's what we were talking about a little bit before with respect to some of the data emerging out of Israel. If people got vaccinated earlier on in the pandemic, their immune system might not have as robust a response as we go out further in time.

The second reason why you might need a booster is if there's a new variant that comes up that circumvents the protection that the vaccines provide. And if we look at seasonal flu as an analog, that's the reason why every flu season we need a new flu vaccination because the virus changes over the course of time. Every season there's a new strain of it that comes up. As a result, we need a new vaccine to kind of counter that strain of the virus, right? So those are the primary two reasons why we need booster shots.

Now, what we know right now is that for COVID-19 it does look like boosters have a role to play here in high-risk populations. So these would be people that are immunocompromised. So let's say someone had an organ transplant or they have an immune system disorder or they're on immunosuppressant drugs like steroids or the elderly, the older population. And now some countries are actually moving in this direction already as people have already seen Israel, Germany, and I think even France more recently recommending boosters for those higher risk populations.

Now, in the US, the CDC is still reviewing the emerging data that's coming out of the various companies in terms of the follow-up data. And they host these panels, the ACIP panels, probably once or twice a month. These are bodies of experts that review the data, and then they would make a recommendation. So ultimately I would expect by maybe later this summer, early fall we'd have some kind of update from the CDC regarding the outlook for boosters in the US.

In terms of what we model from a Pfizer perspective, we're assuming boosters in the elderly or high-risk population on an annual basis, and then every other year in younger adults. But obviously we're looking forward to seeing additional clinical data here over the course of the rest of this year.

The last point I'd make is that Pfizer is planning to file for an EUA with FDA in August for a booster dose. And then they'd file ex-US as well kind of after that.

**Allison Nathan:** But just to clarify, when we say booster shots, are we talking about getting another shot of the same formulation? Or are companies actively providing new formulations with higher efficacy to the newer strains?

**Terence Flynn:** So when we think about it, there are two different types of booster shots that the companies are working on. The first would be a third dose of the same vaccine you got your first time around. And so that would be a third shot six, twelve months later. So that would be the first type of booster.

The second would be a different formulation of the vaccine that is tailored specifically to address one of these newer strains of the virus. So, for example, Pfizer and Moderna both have programs looking at boosters against the Beta variant. Pfizer's also talked more recently about starting a trial looking specifically at a Delta booster vaccine. They don't think we'll need it, but again part of what the work the companies are doing is laying the groundwork so that in the event there is a new variant that emerges that the vaccines have less efficacy against and we need one of these new strains, the companies know from a regulatory perspective what to do and how to navigate that pathway to bring this to the market in as quickly and safely a manner as possible. So a lot of the work going on by these companies now related to these kind of next-gen vaccines are really to lay that regulatory groundwork so that in the event we need it they'll be prepared.

**Allison Nathan:** So as we enter this next wave of infections, what do you see as the next stage of vaccine development?

**Terence Flynn:** Sure. So I'd say definitely the boosters are front and center right now. I think a lot of efforts at the companies on that front. And making sure that the global community is monitoring for different variants. And so that if there is one that does come up that we have a more significant loss of efficacy against, the companies can then develop that next-gen vaccine very rapidly. So that's definitely I think one of the major efforts.

The second one is obviously the manufacturing. I mean, these companies, as you know, Allison, have really been under tremendous pressure to ramp their manufacturing capacity to meet

the global demand here. And typically these companies have a number of years to do that. Given the pandemic, they had 12 months to do this. And so they're still in the process of increasing their production capacity, and so that's another big focus at the companies right now where they're all hoping to be able to increase production into 2022.

The other one, which is more of a longer-term effort, is to come up with a combination vaccine. So essentially if we do need more frequent boosters with the COVID-19 vaccine, there's a potential to combine that with a seasonal flu vaccine. And so that would be a so-called multivalent vaccine. And so essentially instead of getting one shot for each, you could go into the doctor or pharmacy and you could get a single vaccination for all this. So essentially combining some of these vaccines into one to make it more convenient for people.

**Allison Nathan:** Thank you so much for breaking this all down for us, Terence. Unfortunately, it does sound like we're entering or really have already entered, a new chapter of this coronavirus, but we really appreciate all your insight.

**Terence Flynn:** Thanks so much, Allison. Really appreciate the invite.

**Allison Nathan:** We'll now speak to Daan Struyven, a senior economist in the Global Economics Research Group. Daan, welcome to the program.

**Daan Struyven:** Thanks, Allison, for having me.

**Allison Nathan:** Daan, we just spoke to Terence, who provided a relatively reassuring picture about the extent to which vaccines are providing protection against the Delta variant. But give us the update in terms of where things really stand. Where are Delta variant risks rising, and where are they receding?

**Daan Struyven:** Yeah, so globally the virus picture is pretty mixed both in DMs and EMs. In developed markets, the news is mostly positive in Europe, especially the UK. The UK is a fascinating case study to follow. Cases are down 50% since the peak. New hospital admissions are starting to decline, and this happened after full reopening. And we also just got new July PMI data showing that the economy is reaccelerating following the peaking cases and full reopening.

I expect that most of Europe will follow the UK trajectory with

a lag. And you're starting to see that cases are peaking or have started to decline in other European economies that were exposed first to delta. Most notably Spain but also Portugal and [UNINTEL]. The rest of Europe seems to lag. Cases are still rising in France, Italy and Germany although the case levels are fairly low in Germany. So overall, I would say that Europe news is positive, especially in the UK.

Moving to the US, the news is somewhat negative, I would say, on that. And you have very large differences across regions. Although at the national level, we now have 55,000 people in hospitals. We have huge differences across states depending on the vaccination rates. For instance, in Florida, one individual out of 2,000 is now hospitalized for COVID. It's a staggering number. That number is only one out of 100,000 in Vermont. So huge differences across states depending primarily on the vaccination rates.

We do think that the increase in the spread of the Delta variant is going to weigh moderately on growth in the US mostly because of consumer risk aversion primarily among the vaccinated individuals, in fact. We just got a Gallup new poll showing that the share of Americans that feels protected has dropped from 50% last month to now 38%. And what's fascinating is that the people who are really scared, feel unprotected, are the fully vaccinated individuals. And people who feel safe are the people who don't plan to get vaccinated. So I think risk aversion is very important in the economic effects, not only about objective medical risk here.

**Allison Nathan:** So you mentioned a huge discrepancy in terms of hospitalization rates between certain states like Florida and Vermont. What does that look like in terms of vaccination rate discrepancies?

**Daan Struyven:** Yeah, so the gaps are huge, and the correlation between, on the one end, vaccination rates and, on the other end, hospitalization rates is very large and negative. The vaccination rates of the full population, for instance, in Alabama is around 43%. Whereas in the Northeast, places like Vermont, Massachusetts, more than 90% of the adult population is vaccinated. And so you have these pretty large discrepancies, and they're correlating incredibly well with hospitalization rates.

But I think there are some interesting dynamics here. The fact that you still have high virus transmission, for instance, in

Florida or Alabama, I think is indirectly also weighing somewhat on the recovery in high vaccination states because people also respond to the national news cycle. We actually did some statistical work showing that the impact of the national virus situation on your consumer behavior is actually larger than the impact of your local virus situation. At least that was the case last year before vaccination. And so I do think that it matters and is consistent with a slowing in the consumption recovery we have in our forecast.

**Allison Nathan:** Just because I'm hearing bad news out of Florida on the trajectory of the virus, sitting here in New York might be more hesitant to go to a restaurant, for example, even though I'm fully vaccinated and rates are lower?

**Daan Struyven:** Exactly, yeah.

**Allison Nathan:** Interesting. So you actually lowered some of your forecasts based on the Delta variant trajectory, right?

**Daan Struyven:** Yeah.

**Allison Nathan:** And so what really did then factor into that?

**Daan Struyven:** Yeah, so we have lowered our US growth forecast moderately. We shaved off our consumption growth in the second half by 2 percentage points annualized primarily on the back of a slower recovery in the consumer services sector as lingering virus fears continue. But also because the return to office is going to be quite a bit slower than what we initially envisioned. And so the office-adjacent economy -- think the restaurants around the office, for instance -- are still well below full utilization levels. So primary reason for the growth downgrade is a slower consumption recovery on the back of Delta but also bottlenecks that are a bit more persistent than expected, including in housing.

**Allison Nathan:** Okay. So a lot of variation in the developed market world. What about in the emerging market world? What are you seeing there?

**Daan Struyven:** Even more variation across the continents with somewhat positive news in most of Latin America actually. Outside of Mexico, in most large Latin American economies, cases are coming down. Vaccination rates in Latin America and especially natural immunity rates are among the highest in the world. And that's a very sharp contrast with Asia Pacific, which

did very well in 2020 controlling the virus through policy restrictions. But as a result, natural immunity rates in Asia Pacific are lower. They got started late with vaccination efforts. And in most Asia Pacific economies, the virus situation is deteriorating. We sharply cut our forecast, for instance, in India a few months ago, ASEAN region, Japan, Australia. And now the big focus is on China where the number of cases has been rising pretty quickly at still fairly low levels but with a much more transmissible strain. There's just a lot of uncertainty whether zero COVID is achievable, even in China which presumably is one of the most effective countries in the world to contain the virus. So lots of uncertainty around China growth in the third quarter here.

**Allison Nathan:** When you look at the emerging market world, is the lower vaccination pace mostly a result of supply? Or are you also seeing vaccine hesitancy taking hold in those areas?

**Daan Struyven:** So it's mostly supply. In a few countries, it's also distributional constraint, in some of the Asian economies. But it's primarily supply. What's actually remarkable is demand, vaccine demand, seems to be stronger on average in emerging markets than in developed markets. If you sort of look across the world compared to actual vaccination rates and the survey data, countries that score really high in terms of vaccine demands are the UK, Spain, but also Brazil and several other emerging markets. And on the low end, you find certain states in the US, France, Japan, Australia and Russia. Although recently we're starting to see pickups in vaccine demand primarily in the places where demand initially was low as a result of policy changes and a result of outbreaks.

**Allison Nathan:** All right, so put this all together for us. Where was our global growth forecast let's say three months ago before Delta took hold? Where is it now?

**Daan Struyven:** Yeah, so we have lowered our growth forecast somewhat since the emergence of Delta in April. But what's the most remarkable is that the gap between our global growth forecast for this year and consensus has shrunk quite a bit from around a full percentage point, which is a lot, to just three tenths.

At this point, this narrowing in the gap reflects both downgrades to our own forecast in many economies but also upgrades to the consensus who I think has been a little slower in sort of adopting a positive view on vaccinations and on US

fiscal stimulus.

The largest growth downgrades have been in Asia Pacific, especially ASEAN. The biggest downgrades reference is in the Philippines or Thailand, who are not only suffering from high virus transmissions and restrictions but also a very slow global tourism recovery. You know, also notable downgrades in the US on the back of Delta but also on the back of bottlenecks in housing, in the labor market, and in the goods sector. Our growth forecasts have been fairly stable in Europe. We're still pretty bullish on Europe. And actually in LatAm, our forecasts have increased.

At this point, the two biggest differences between our global growth views and the consensus is, one, we're more selectively bullish. And sort of the only places where we're really a lot above consensus are places where there's a lot of room for vaccine-driven reopening. Most notably Spain, Southern Europe, but also India.

And the second most notable feature of our global growth forecast is just the sharpness of the US growth declaration where we essentially returned from around 7% growth this summer to a potential lag base of 1.5 to 2% in the second half of next year on the back of slower reopening and a fiscal impulse that turns from sharply positive to negative in the back half of next year.

**Allison Nathan:** And then thinking about risk, I don't want to put words in your mouth, but it does feel like the Delta variant and maybe other variants still are the biggest risks to our growth outlook, even one that is now embedding a sharp deceleration in growth in the US, for example. But are there other risks that you're also monitoring?

**Daan Struyven:** So the biggest downside risk is the emergence of a new strain that would be more transmissible out competing Delta but also sharply lower the ability of vaccines to prevent hospitalizations. I think the Delta risk is a quantifiable risk because we know that you can still prevent hospitalizations, which implies that in high vaccination economies restrictions should be limited.

But the virus has mutated quite a lot. You know, we were not talking about Alpha until December of last year. We started speaking about Delta in April. And who knows? There's a lot of global virus circulation, so according to experts it's a

plausible risk.

The other big downside risk to global growth is also related indirectly to the pandemic. And I would characterize it as a slower recovery of the global supply side of the economy both in the goods sector but also in the US labor market. On the goods sector, our baseline view is that inventories will be rebuilt in the coming months and that you should get a nice boost to growth from global inventory reformation, which has really weighed on growth in the US or Germany or France in the second quarter.

**Allison Nathan:** So you're just basically talking about all the supply shortages we're talking about, we're running out of a lot of things.

**Daan Struyven:** Exactly.

**Allison Nathan:** And the implications of that. Okay.

**Daan Struyven:** Yeah. So that could take longer than expected. Inventory levels are really low. And if a lot of the Asia Pacific economies continue to struggle with lower vaccination rates and potentially also zero COVID policies that are really hard to achieve, it could just take longer for the global industrial sector to recover.

Similarly, our baseline view in the US on the labor market is quite bullish. We expect the unemployment rate to fall from 5.9% to the low 4 percent this year on the back primarily of the expiration of the generous federal unemployment benefit top-ups. But also rising vaccination rates. It could take longer. Perhaps that there are more complex reasons why people are not back at work. People are sort of potentially revisiting their priorities post-pandemic between work, leisure, money, family, health. And so I think a slower US labor market recovery is also something I worry about, and I'm going to learn a lot in the next few months.

**Allison Nathan:** Right. And from that, ultimately it's just are there people to service the industries that had been lagging? And if there aren't, there could be a constraint on growth. But ultimately we're expecting that to fade.

**Daan Struyven:** Exactly.

**Allison Nathan:** Thank you so much for the update, Daan. Let's hope we don't have another variant coming our way, but we

appreciate you being here.

**Daan Struyven:** Thanks, Allison, for having me.

**Allison Nathan:** That concludes this episode of Exchanges at Goldman Sachs. Thanks for listening, and if you enjoyed this show, we hope you subscribe on Apple Podcasts and leave a rating and comment. This podcast was recorded on August 4th and 5th, 2021.

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