MR. WESSEL: And then we're going to move to the next segment which is really important because it seems to me that there's a question not only about what we should do, but how we should get there. And it may be that we have something to learn from the Canadian experience. So, I want to introduce John David Murray who was for 32 years at the Bank of Canada -- 32 or 34, John?

MR. MURRAY: Thirty-four.

MR. WESSEL: Thirty-four years at the Bank of Canada. Last four as deputy governor. He retired in -- three years ago and is now an academic and a board member and he's going to talk a little bit about how the Bank of Canada has come to have a much more organized process about reviewing the framework. And then Eric Rosengren the president of the Federal Reserve Bank of Boston, who has been thinking about just that question, is going to respond. So, John.

MR. MURRAY: Is this mic on?

MR. WESSEL: It is.

MR. MURRAY: Thank you. There should be a PowerPoint that accompanies this. Not that one. (Laughter)

SPEAKER: Just click it forward.

MR. MURRAY: Oh, there. You can see what I propose to talk about and for central bankers in the room, this will usually make them apoplectic. (Laughter) Partnering with the government. But I'll explain what I mean, and it relates to David's introduction. The special way that we partner with the government in Canada and perhaps what I'm going to relay is somewhat unique and specific to Canada, but I think you'll find it interesting and beyond that. I also think that there are more general lessons here. So, don't want to over sell it.

The first thing I'd like to say is that, in fact, standing things on their head a little, when inflation targeting came to Canada, it was actually the government that proposed it, not the Bank of Canada. Now, you might say, why did they do that? Three quick reasons come to mind: One of them, the most positive perhaps, is that they thought it was a good idea and they thought the Reserve Bank of New Zealand provided an interesting lead. Some encouragement. So that's number one. Number two, is that the government was in the process of introducing a new goods and services tax, a VAT which was going to boost the headline inflation rate quite significantly and this coincided with a situation where

unfortunately, they had to negotiate labor contracts with all most all the units in the federal government. So, we can think of them wanting an inflation target as some kind of assurance. Some kind of buffer to see them through this difficult period. And the third is sort of a preemptive act, that the Bank of Canada had started on a very sort of aggressive, determined, track and was out there talking about the virtues of price stability which I know isn't anything new for a central bank, but this was in a very direct and the term (inaudible), and though no numeric target was given for an end point on this. When asked by a journalist what this might mean, the answer was for inflation: Four is not as good as three. Three is not as good as two. Two is not as good as one and one is not as good as zero. So effectively, don't want to put words in his mouth, we were talking about price stability.

So, you can think about this as a preemptive act on the part of the government so that in their view things didn't go too far. What was the bank's reaction to this proposal? Well, it was mixed. There was the positive; they were very receptive to the idea of inflation target. They were less enthusiastic about the way the government wanted to go about it. They wanted to aim for a relatively high rate, not high by that time, but say 3 percent. And they were thinking of something sort of short term. I'm going to call it a patch through this difficult period. The bank's reaction to this was that it had to be meaningful and it had to be long term. It had to be serious. And in the event, perhaps a little surprising for some, the Bank of Canada's view prevailed. And what we got in the end by way of the very first announcement in 1991, was an inflation target of 3 percent for 1992 going down to 2 percent in 1995, and there was a 1 percent band to either side of these targets. But what's perhaps most interesting, is that this was regarded as only a beginning that after 1995, five years hence, based on experience, this issue would be revisited, but with a strong presumption, a gain that 2 percent was only an interesting start and you were going lower.

The first renewal of the agreement the bank had with the government, in other words, 1995 was to review the experience, but it was related to that thought of in terms of, but one and done, that after five years' experience, surely, we'll have enough information that we'll be able to peg the rate, the optimal level of inflation for us and then that's it. So, this was not seen as the beginning of an ongoing process of renewal. Key aspects of the agreement were this was simply a joint press release by the bank and the government and it came out as part of the government's February 1991 budget.

There is no supporting legislation for this and in deed that's been a part through time. It's public and that extent has some force, but it is agreement between parties. It's a partnership with one admittedly more equal than the other ultimately. The government of Canada for a long time, it's been very clear in the legislation, has the power to issue a directive to the Bank of Canada. If it's unhappy about monetary policy, it can tell them what to do. This came about in 1967 as a result of events that I won't go into. But there are three conditions around that ability: One is that they have to be very specific about what they don't like. Two, they have to be very specific about what they want the bank of Canada to do, and three, it has to be published and there's always been a presumption that if it was ever used, the governor, at the time, would feel compelled to resign. Perhaps, as a result of that, it's never been used. This nuclear option.

What it means is that having that in place is good in two ways in our view. That it does give ultimate responsibility for monetary policy to the government, but it also insures that they can't use it too lightly, and effectively give the Bank of Canada considerable operational independence, instrument independence. I'll speak to this later, hopefully quickly. We actually see the agreement instead of eroding that independence potentially rather enhancing it because once you've got the government to sign on, the scope for them to criticize as long as you're actually doing your job becomes more limited.

So, we see tremendous advantage in this public agreement and as I'll mention in a minute, this renewal process that's developed where it's refreshed every five years. I've talked about the early ambitious regarding ultimate price stability, at the origins of the process -- let's see have I got this right? Just to give you a flavor of where this was headed initially, the first bullet doesn't complete all of it, just lays out specific targets as I described earlier. I think the last two bullets are more interesting for you. Thereafter, that means 1995, the objective would be further reduction in inflation until price stability is achieved.

The last one, based on a lot of work that the Bank of Canada had done in advance is, a good deal of work has already been done for Canada. This work suggests a rate of increase that is clearly below 2 percent and you might ask where did that come from? Well, it came from a lot of research, but the three reasons for having an inflation rate above zero at the time for us, we're not regarded as that material. We had a measurement bias in the CPI, but it was judged to be very low

presently probably and then half a percent or less now. That's not a reason to have a 2 percent target. We could find some statistical support for this notion of nominal age frigidity, which would be the second argument, but our work suggests that economically it was not very important or meaningful. And because of the great moderation perhaps we've underestimated the significance of the effective lower bound that was something that we thought if it did occur, surely there would be means to overcome.

So that's where we were coming from at the time. In the event the target was renewed with the government in 1993, I won't go through why instead of '95, and it's since been renewed in 1998, 2001, 2006, 2011, 2016, it's up for renewal 2021. Was referred to earlier, despite all these renewals, there's been no material change. The 2 percent has been maintained at the midpoint and the language around it is quietly changed. Instead of talking about price stability so often, we talk about low, stable, and predictable inflation as being the good thing. One of the reasons, and it's perhaps the reason the 2 percent target hasn't changed, is that the economy seemed to perform so well, better than expected under the 2 percent inflation target. So that set a rather high bar for doing anything adventurous especially you'll note the date for some of these renewals coincided with episodes in which the economy the situation was particularly uncertain 2001 right after the tech bubble. 2011 well into the follow from the great recession. But just to give you a flavor for how much things changed on the inflation front, looking good.

We actually did so well, that the IMF and others accused us of covertly price level targeting and you can see why looking at this graph that might be a reasonable suspicion. The blackline shows you a hypothetical price level that has allowed to grow at 2 percent a year and up until about 2012, 2014 even, we're doing a remarkably good job. This came as a surprise to us. (Laughing) No, not the good part. Not the good performance. We knew we were doing a great job, but when the IMF pointed this out and accused of covertly price level targeting, which is itself a little odd because the major benefit of price level targeting is to advertise it, so you can condition (laughing) expectations. As we reflected on it, two things, people have referred to luck earlier and perhaps a sequence of shocks that happened to be offsetting or symmetric more or less. But another thing that's been mentioned and we learned to appreciate its importance even more is our reaction function, which like many central banks put a large weight on interest rates moving and if you think about that, that already introduces quite a bit of history

dependence and you are inflation averaging unwittingly. You might as well take credit for it.

Quickly, the advantages of a regular renewal process: You may say, what's the point if you don't change anything? But there's a lot going on underneath is what I'll maintain. The first, that we believe this is a critical part of our accountability. That this is a critical element of our fiduciary responsibility to Canadians to ensure on a regular basis that we are working under the best possible framework for them. Second, it's a way of diffusing potential problems, and by that, I mean if this is a once in a lifetime event, "Oh, they're going to renew the target and things might change," there's a lot of excitement around it. But if there is a regularity to it this is business as usually, you diffuse a lot of that. We're just taking care of business for you.

Next it promotes -- oh wait -- deliberate and transparent mechanism to engage stakeholders in the feedback. This is terribly important, the transparency part in particular. When the Bank of Canada renews the agreement with the government, this isn't the product of some sort of secret discussions between the two, this is something that is initiated quite early on and the Bank of Canada is very careful to lay out the issues it proposes to address. The changes that it might consider and to invite feedback from the public, from the government, of course, from academics and it's the beginning of a sequence of often conferences as part of this process. So, the transparency to our mind is important in terms of credibility and buy in. And that's a way of promoting public awareness and understanding. It's a driver. Kristen mentioned this, a driver for more focused research effort within the bank and something new has actually been learned on every occasion.

It's not as though we find it hasn't deepening our understanding of the economy or the monetary policy process. Nothing has changed, but things are going on underneath. Possible disadvantages -- some have argued that by renewing every five years, perhaps you're not going to anchor expectations. If the market thinks every five years there's a possibility your going to change, inflation expectations might not be well anchored. I'll show you some counter evidence in a minute. There's increase scope for unhelpful interference and this has been the topic of Sarah, a lot of people today. And that's true, there's a risk. Could say waste of time and energy. I mean, if nothing really changes in the end, what's the point?

And then you can relate it to that trying the public's patient sort of announcement fatigue,

"Oh, we're going to renew, we're going to renew. Oh, 2 percent. Did I mention that?" (Laughter) Counter arguments -- there's absolutely no from Canada, very little, of fragile or unanchored inflation expectations as a result of this. It's actually a mechanism for enhancing the central banks' independence we would maintain, and it's important confirmation of the framework's soundness. Even if nothing changes, the fact that you are confirming that in your view, we are where we should be is important. Inflation expectations that's just to show you that this is based on two and three-year inflation expectations. You always get a little movement, but they're remarkably stable for that term, one to three years. I'm near the end.

Quickly, what are some of the issues the Bank of Canada's examined in the last 27 years? I divide them in two categories, fundamental and then sort of housekeeping or operational. The fundamental ones, which we've always looked at, should the inflation target be lowered? That occupied everything right through to the 2011 agreement. It's only in 2016 that the question was turned and should we raise the inflation target? In the end we didn't. And I can explain why. Maybe I'll do it now, very quickly.

There'd been this predisposition towards lower is better staring at the beginning. And this had sort of receded a little, but there had always been a sense that lower inflation something close to price stability would be better. And price level targeting held a lot of attraction for some of us as a way of achieving a lower inflation rate while dealing with the effect of lower bound. If price level targeting works, it actually reduces the swings in inflation, in output, in interest rates. You need much less by way of interest rate movement to stabilize the real economy and inflation.

The key is communications and credibility. People have to know what you want to do and believe you're going to do it and that could be a big if. Would price level targeting be better? And again, as I mentioned a lot of us thought, oh, that's kind of good, interesting. How much recognition to give to financial stability consideration, i.e., leaning? Do you want to modify your reaction function in a way and give that recognition your framework? We asked that as part of the 2016 thing and the answer was, probably not much.

That we'd already gone on record in 2006 speaking about leaning and its potential advantages. We refreshed that in 2011 and addressed it again in 2016. 2016 we actually stepped back a little, where as in 2011, we said, "Oh, it could be a fourth line of defense," that if supervisors and

regulators weren't doing their job, that's too bad. If macro credential tools didn't appear to work, if investors weren't being provident enough, shame on them, or institutions as a fourth line of defense, if you really had to, you might lean. But by the time we got to 2016, we'd been influenced by the work of Lars Spencino that shows there actually might be a negative benefit to leaning if you do more damage than good. The bank didn't quite run away from that in their latest renewal, but it was sort of easing back.

Operational housekeeping matters, CPI, the best index still that's the one we do target and we favor that for a number of reasons. Best measure of core inflation, that's changed a little through time. How important is measurement bias? And we confirm every time that it isn't something bigger indeed as some changes that have been made by Statistics Canada, it's a little smaller. It wasn't big to start with and it's smaller now.

Looking ahead, this is my last slide, next renewal set for 2021, Bank of Canada already mapping out a research agenda for the next five years. The final questions have not been determined yet or else they'd be advertised, but they intend to take a broader sweep this time. Instead of just looking at the objectives or the framework per se, but to also look at tools in more detail and communication. Old issues will almost certainly be revisited, other new initiatives will no doubt be added here in terms of the fundamental issues while we've done a lot -- I've retired I shouldn't say we --well, the Bank of Canada has done a lot of work on lowering inflation it's advantages are cost price level targeting. While we talked about it and did some work, we didn't talk about nominal GDP targeting and I think that is going to be revisited in level form as opposed to growth rate. I can't be sure. This isn't based on information -- or inflation averaging where instead of -- we already inflation average, we just happened to pick a 12-month period for that. What it did two years or three years or like Australia, over the cycle and as I mentioned earlier, we already do it, kind of with our interest rates moving and the reaction function.

So that's some of what will be looked at. But the main take away I want to give you is that the Bank of Canada really values this renewal process and it doesn't become sort of a dog fight between the central bank and the government. Maybe that's a usual situation. Now, you may argue -- oh, I'm almost --

MR. WESSEL: That's fine.

MR. MURRAY: -- you may argue that you can't take much comfort from that because

we've never proposed a major change, why would the government, sort of be nasty or push back? And that's fair argument, but turning it on its head a little, I can say from my experience, I am not aware of the government ever pushing us to do something or to change something. Like wouldn't a little higher inflation be nice for everyone? So, the fact that that question was raised in 2016 and examined, isn't at the behest of the government or anything, you know, take it easy, no. That very much the bank has been carrying the load on the proposals, the proposal changes, and the research, bringing the government in the end. It is a partnership and obviously, they have final, final say to a degree, but there's a lot that's been going on and I'll end with this. What did I mean by a lot going on underneath? Although we didn't change anything major.

You can see where we started. There was a strong presumption that we were going lower. We had research to support it. Two percent was nowhere near price stability and price stability would be of tremendous benefit to the economy because measurement errors is a problem, nominal (inaudible) wages doesn't matter. The effect of lower bound doesn't matter. The first two, really haven't changed materially. The third one clearly based on experience, has gained more importance, but where I think we come out in the end is that the painful experience -- I shouldn't call it painful -- the experience with the great recession, unconventional monetary policy, which we still believe works effectively, you just have to try harder, sort of gave us a slight -- a different view on the importance of the effective lower bound. But I think the Bank of Canada jut reached a point where it made it happier about 2 percent as opposed to revising its view about how high it needed to go. Feel the unconventional tools are effective. The feel that fiscal policy could play more a partnering role in desperate situations hopefully so you're not on your own, it doesn't become a headwind instead of a tailwind for. Just a number of things and also this view, this judgment that it's a little early to call a big change in the neutral rate.

And I like the point that was made based on John William's graph that sure it's been going down, people are in the habit of saying, "Oh, it's been going down for 25, 30 years." Maybe a little because of demographic things, but it didn't fall off a cliff because of those and to sort of take that as your base now, oh, it's a random walk from there, I don't know. That seems a little presumptive. So anyway, I'll stop.

SPEAKER: Thank you Mr. Murray.

MR. WESSEL: So now we're going to turn to Eric Rosengren who I'm sure will say something that was said earlier at a lunch we had that maybe all that's different is the Canadians are nicer, so they can do this. (Laughter)

MR. ROSENGREN: Thank you very much. So, let me just put John's very nice presentation in the context of this conference. So, this conference started by Larry Summers talking about the fact that very low interest rates for a long time were both quite likely and quite costly. The second panel then talked about what are the possible solutions? Giving a number of different frameworks that would make that less likely or less costly.

MR. ROSENGREN: The third panel put together a group of stakeholders and talked about, more broadly, how the various stakeholders should care out this issue. And this final panel is really to talk about process. And so, I am going to talk about process in this panel rather than necessarily go into details about the various proposals that have already been discussed. So, we heard what Bank of Canada did and I think it was a very clear presentation, so thank you very much for that, John. And I want to put it in the context of how applicable is this to the United States. There are a lot of differences between the United States and Canada and we'll -- I'll start with, we start with a very different framework.

So, we do have a dual mandate. So, it's maximum sustainable employment and stable prices. We've explicitly defined the price part of that to be a 2 percent piece, total PCE inflation. The maximum employment, we didn't provide a numerical target because it was viewed that the natural rate moved around. And finally, how do we deal with the fact that when we're missing on both of those two elements of the mandate? Well, we take a balanced approach and Don Cone was the one who highlighted that we don't talk enough about this, and I agree that the balanced approach, I think, actually is quite important that we give equal wakes to deviations from both targets and that's how we're -- this is the operating procedure we should be using.

Each January, the committee reaffirms the framework and so we have the potential every January to make changes. To date, those have been relatively modest; they've been, at least in terms of the overall framework, it's been pretty consistent over time. The main change was to emphasize the fact that we have a symmetric inflation target. There's no mechanism equivalent to what the Bank of Canada does in terms of a five-year review; particularly in the context of having much broader public discussion.

So, we do have a private discussion at these January meetings. It's a relatively small part of the overall part of the meeting; we certainly don't have an entire research agenda over a five-year period and we don't have the extensive public comment that the Bank of Canada goes through.

So first, the Congressional mandate that we have hasn't changed. So why should we think about a framework that changes when out dual mandate doesn't? And I think there are a couple reasons for why we should think about that. We started with an inflation target around 2 percent because it was viewed that it was probably likely to be in the neighborhood of optimal and there was a lot of work done both in the United States and abroad and most central banks have picked a target that's very close to 2 percent. I would say that that research was broadly done at a time where we didn't think we were going to hit the zero lower bound very often and we didn't think it was going to be very hard to get off that zero lower bound. So, what's new about thinking about it at this juncture is that we have been through this period of extended low interest rates, not only in the United States, but in Europe and in Japan as well.

We also have different characteristics now then what we were having going into the great recession. We have very slow productivity growth. We have very slow population growth, aging demographics. All those would tell us that it's quite likely that we're going to have relatively low real interest rates as long as those conditions hold. So, in fact, what we've -- in our initial framework kind of thought about inflation being constant with -- at 2 percent. You could argue that the optimal rate of inflation, if you think you're going to hit the lower bound depending on what's happening with population, demographics and productivity. That the optimal level of inflation shouldn't necessary be constant; it should actually be moving around so it's not just the employment part of the mandate that might change over time, it may be that the inflation part of the mandate would change over time.

The second reason for thinking about it at this juncture is that we've fallen short of our inflation target, so, we've been -- almost every major developed country around the world has missed on their inflation target through much of the last 10 years. Under shooting inflation has occurred, not because we haven't tried to get inflation back up to 2 percent; there've been very aggressive actions taken both in the United States and at major central banks around the world to try to alter that. We've had quantitative easing, we've used a number of other tools that we hadn't historically used. So, despite

those best efforts, we haven't been able to hit the 2 percent inflation target. I would say, like John, that I do expect over the next couple of years we will, but nonetheless, we do have this period of missing for quite an extended period of time.

The third factor we have to think about is fiscal policy. So, fiscal policy, the rising debt to GDP, gives us less of a buffer in fiscal policy just like we might have less of a buffer on monetary policy. So, the potency of non-traditional monetary policy, I think we've heard different opinions in different panels today. So, there's disagreement about exactly how effective these non-traditional policies are. But I think what's clear is that we certainly didn't get back to full employment in 2 percent inflation target as quickly as some people had hoped. And the trade-offs between the goals and the optimal level of the goals may be different over time so maybe the F1C should be talking about that in a more concrete way.

So, Bank of Canada has periodic assessment and I do think that a federal reserve led assessment that thinks about getting a variety of sources to provide us input actually does make a lot of sense. I think it is opportunity to actually think about whether economic fundamentals have changed in a significant way. Equilibrium interest rate is the one that most of the speakers today have highlighted. But we should think about what are the best ways to make sure that we're satisfying the congressional mandate and if economic fundamentals are changing then we should be factoring that in to say are we really meeting the mandate with the framework that optimally tries to address the guidance that Congress has given us. So, it would be good to have a more standard way to think about whether the framework should change over time. The Bank of Canada experience highlights that you don't have to change it very often. And in fact they've made very few changes. But, thinking periodically about the costs and benefits including the cost of transitioning, which Chairman Bernanke did talk about quite a bit. And also, then, what are the longer run implications and longer run implications would include how likely is it that we'd be hitting the zero lower bound for extended periods of time.

So what would we reassess? Well, I think it's basically the second panel. There were a number of different proposals that were laid out, so having a more concrete discussion including getting input from people outside the Federal Reserve as well as people inside the Federal Reserve. We could think about whether the optimal inflation rate does change over time. And actually, I would argue that we should be thinking more in terms of an inflation range rather than a fixed inflation target. I'm not going to

go to any length today because I don't have time, but I will talk about it later this week. But I think there are other ways to think about having a little more flexibility than what we currently have with our inflation target.

The process should reflect the unique Central Bank features. So one of those features is obviously the political economy; that was the topic of the previous panel or at least part of the previous panel. And I do think the politics are a little bit different in the United States than they are in Canada. Canada has a parliamentary system, we have a checks and balances system. That may mean that some of the lessons from Canada may not translate perfectly. We need to focus on structural changes that could reduce the efficacy of the feds policy framework. But I really think it is important that this doesn't become a partisan exercise. So this should be viewed as a technical exercise. How we best enforce the mandate Congress has given us, not a question of whether we're re-evaluating the congressionally given mandate.

While any kind of significant change should involve consultation with Congress and when we were thinking about the 2 percent inflation target, there was consultation with Congress at that time as well. So, any change in our framework, I think, does require not only a broad discussion, but also a discussion with congress to make it clear that this is what we're thinking of doing. My own personal preference would be to conduct a full review like the Bank of Canada. I don't know whether five years is optimal, so I think we should give a little thought to having a certain frequency in which you have this discussion. However, I think it's also probably useful to have the possibility to call for an earlier review if you picked longer periods of time.

We certainly have learned things from the great recession, thinking that we would come up with the exact same policy now that we would have in 2006; given all the things that have transpired over the last decade, tells me that there are maybe times where you think that you should actually have more of a reflection and that may not actually fit in particularly well with a five-year timeframe or longer timeframe if that's what you picked. However, clearly I think it's an approach that there are a variety of permutations so the F1C could consider. But, I think the basic idea of a structured discussion where there's governance around that you have to actually have to address these issues actually is an attribute that I think has quite a bit of value.

So, my concluding observations, the Bank of Canada has a process and as I've gotten older, I've gotten a better appreciation for the fact that having these kinds of processes and governance actually does matter. It does give you an opportunity to have discussions that you might not have otherwise. It also is a good way of communicating with the public more broadly about what you're doing, why you're doing it? And, also having a clear communication with Congress about what you're doing and why you're doing it. So I think those are incredibly important aspects of central banking. In my own view, the cost of hitting the effective lower bound for a prolonged period should cause us to at least have a reassessment and at least think about what the implications of that are. We might, like the Bank of Canada, choose not to do anything, but we certainly should be having those discussions.

The great recession was a big enough event that we certainly should have a period where we reassess and say, "How do we make sure that we don't have those kinds of events?: We certainly did it on supervisory policy; there's no reason not to reflect back and ask, on monetary policy, is there anything we should think about differently. So having a process that can fully and more transparently examine the monetary policy framework, I think, would be a process improvement. So, I thank John for his discussion because I think there's a lot of positive attributes. I think we probably would have to think about how that fit into the U.S. framework, both politically and monetary policy framework. But I think that, nonetheless, as an instructive lesson that we should give some thought to. Thank you very much.

MR. WESSEL: Thank you very much. I'm just going to ask a couple of questions and let the audience weigh in. John, can you just explain a little bit how does this work in practice? Does the Bank of Canada come up with and publicize the research questions and run them by the government or how does that get started and then what happens over the five year period?

MR. MURRAY: That's a good question, David. I tried to give some flavor for that in my presentation. I think we -- it's the Bank of Canada that does the running, does the proposal and any, for questions to be asked, changes that might be reasonable. We do give the government a little heads up before we come up with our list just so they'll know. But there's nothing terribly surprising about that list that it'd be hard for the government to say, no, we don't want you to think about any of these things. They might resist, of course, of us doing it, but that's different than researching it, asking the questions; trying

to do the best thing possible.

What has happened through time is, I guess what we thought of initially was a one off, you know, one and done, and then we know forever quotes; what the rate should be. That actually continued for two or three renewals where we always thought, oh, the next one is going to tell us then another five years' experience helping us test the waters, see what's happening, then we'll know. But I'd say by about 2001 anyway we -- well, views changed on some things, but recognition was given at that point to, hey, there may be some benefit to this repeated exercise and since then it's something that we take quite seriously and it's something that we map out quite carefully as I've indicated. It's not that we've spend the whole five years looking at nothing but the inflation target renewal, but it provides a road map for our research and other people who we hope will join us --

SPEAKER: You bring outside (inaudible).

MR. MURRAY: Yeah, exactly, exactly.

SPEAKER: And the questions are made public at the beginning of the (inaudible).

MR. MURRAY: Oh, yeah, yeah.

MR. WESSEL: And the discussions and papers and all are public?

MR. MURRAY: Yeah, there is a website that's set up.

MR. WESSEL: And does anybody pay attention? I mean, did the market (laughter) -- I didn't mean that, usually I mean what I say, but in this case I didn't. I mean, do you get a lot of attention in the press and from the markets or is it -- is it like Jackson Hole or --?

MR. MURRAY: No, it's not like Jackson Hole or Canada, but (laughter) we do have good economic reporters in Canada; a set of them. Admittedly, not very large, but they watch what we do, what we say very carefully. The market is aware and follows that and I think as Ben suggested, the public at large probably don't live and breathe inflation targeting and if it should be changed, but the chattering classes, the opinion setters, I think, do watch and it matters.

MR. WESSEL: Eric, I want to ask you two questions. One is, so is there some institutional inertia that prevents the Fed from doing what the Bank of Canada does or is it a fear of what the markets might say or is it just maybe the time wasn't right, but now it is? What's your sense?

MR. ROSENGREN: There's nothing that prevents us from doing it so any one of those

January meetings could actually be doing exactly what the Bank of Canada does so there's nothing institutionally that prevents us from doing it. I do think when you don't have a regularized process, there's a lot of inertia in any bureaucracy and I don't think the central bank's any different than any other governmental or any many business organizations that this is a process that actually is forcing a discussion and it hasn't been our tradition and it didn't start out as a tradition at the Bank of Canada; either it doesn't sound like. So I think it's more -- you're certainly in the middle of the crisis had been highlighted would be a difficult time to be talking about completely changing your framework.

There's so many other things that you're worried about and it would be very difficult to communicate to the public more broadly about why you're doing it in the middle of a crisis. But, I do think that once you're out of the crisis you'll have a little more perspective; it's a little bit easier to have that discussion. I think the idea that when you're close to full employment and you're close to your 2 percent inflation target isn't a bad time to be reflecting. So I think one reason for you having this conference is we've had enough time to develop to say that maybe we need to think about monetary policy and fiscal policy buffers in a little more coherent fashion. So, I think there is an opportunity to do it if there is a willingness among the F1C to do so.

MR. WESSEL: And then I promise to read your speech later in the week, but I just want to understand what you are talking about. You're suggesting then that instead of saying we have a 2 percent inflation target, we have a range say of, I don't know, one to three or one-and-a-half or two-and-a-half. How does that make things better? Is that just like you can decide we want to be a little higher or a little lower or what?

MR. ROSENGREN: So, if you -- let's say you took an inflation range of one-and-a-half to 3 percent. You're in a period of very high productivity and a lot of population growth, then you probably don't have to worry about hitting the zero lower bound as much and you'd be lower in that range. If you're in a period where the labor force is growing very slowly and productivity is very weak, so you worried about hitting the zero lower bound much more, it's much more likely in the next procession and you might choose to be higher during in that inflation range. So that it gives you a little more flexibility to say, the optimal inflation rate isn't fixed over time.

If you picked a range from one-and-a-half to 3 percent, it actually isn't going to be, it's not

like picking a four or five percent, which is the numbers that some people have picked. So, I think if you think that the population growth and immigration and productivity are going to stay constant, you wouldn't make any changes. But if you're in a world where those things actually can change and sometimes do change, then saying that having the exact same inflation rate, regardless of what's happening with productivity, regardless of what's happening with population growth, regardless of what's happening to immigration, there is enough fixing of the inflation rate that you're going to get a sub-optimal result. So having a little more wiggle room to actually think about what the optimal inflation rate is for that time, without having it so wide, that you have to worry about it's different than the price instability.

MR. WESSEL: And, I won't play with this, but would you then disclose that we're think we're kind of headed towards the high end or low end? Is that an objective?

MR. ROSENGREN: So, we're still following a dual mandate, but we have a range that says we're going to factor in a little bit more about what is the likelihood we hit the zero lower bound and so there is a cost. If we hit the zero lower bound frequently and very hard like Larry Summers did discuss and I do think we're in an environment right now where we're likely to have fairly low interest rates. And so, I think there are -- we haven't talked a lot about what the costs are, Larry gave some numbers. But I do think that monetary policy effectiveness at the zero lower bound is not nearly as, we're not -- we can't get out of that situation as easily as we have thought. In fact, the fact that neither Europe nor Japan have gotten out of that situation yet indicates how difficult it can actually be.

So I think we have to take that and think a little bit about what does it mean if once you hit the zero lower bound, you may be there for a prolonged period. And what does a long period of very low interest rates mean? Their incremental quality issues, their difference between savers and investors, there are lots of things that you have to think about in terms of financial stability if you have long periods of very low interest rates. So I think factoring those in should give you a little bit more flexibility in your monetary policy framework than what we currently have.

MR. WESSEL: Thank you. Peter Hooper? Would you wait for mic because for the benefit of --

MR. HOOPER: Whereas, the Bank of Canada's review is with the Ministry of Finance, I presume in the U.S. case it would be with Congress; one question. The other question is for both

panelists. What are the significant costs of inflation at 3 percent versus one-and-a-half or 2 percent? Any --

MR. MURRAY: Well, I won't be very original; sort of repeating some of the arguments that we and others laid out early on, but -- so it just relates to equity, being fair to people and not having arbitrary re-distributions of income and you know that a large part of the inflation is regressive that those laid stabled to protect themselves; often the poorest, have a more difficult time than those that can accommodate it more easily. And some of it, a lot of it is efficiency arguments that while there isn't a big difference, admittedly, between two and three or two and four. But in terms of what it does to inflation, I'm certainly looking ahead. It's enormous. A lot of people don't realize that even with 2 percent inflation, price levels doubled every 35 years. And for many people, that kind of corresponds to their retirement period. So, you've got more uncertainty about the economic environment, whereas, something closer to price stability provides more certainty. It contributes at the margin better decision making, better planning than you'd have otherwise. So it's sort of this equity efficiency, surely things would work better on notion.

I don't know if that answers the question. I think that's where a lot of, some of us would still be. There are offsets to that and those were mentioned; the bias and the measure, the nominal wage security that might occur hitting the effective lower bound, but --

MR. WESSEL: So, Eric, did you have in mind that there'd be a dual --

MR. ROSENGREN: Yeah.

MR. WESSEL: Yeah, please.

MR. ROSENGREN: So the in a range of one-and-a-half, in a range of one-and-a-half to 3 percent, I don't think most people are going to notice so we've been undershooting for most of the last five years. If we'd exactly hit 2 percent, do I think the world would be dramatically different? Probably not. So I wouldn't want to pick a range that's much higher, but I do think that in that range it would be hard to argue that there'd be big differences between a one-and-a-half, two and two-and-a-half. Where I would worry is; what is the likelihood I would hit the lower bound, may be very different at one-and-a-half than it is at two or two-and-a-half depending on what else is happening in the world, so if I'm in a world where the labor force is growing slowly and we have very low productivity and I'm picking a number of one-and-a-half. Well, as Larry said, you're going to now have an interest rate that's going to be not high

enough that the next time you have a recession; you're almost certainly going to hit the zero lower bound. So thinking about if frequently we have to drop interest rates by 400 or 500 basis points, but we don't have enough inflation plus the real interest rate to get to that level before the next recession hits, I think there is an issue about how frequently you want to be in that situation.

MR. WESSEL: And did you anticipate a role for Congress in this Canadian style review?

MR. ROSENGREN: So I wouldn't argue necessarily for exactly the Canadian style review, but I do think the Federal Reserve could have a broader discussion about our framework and why we think the current framework is the appropriate framework. And I think as part of that there should be public questions that would be shared publicly, including with Congress. And that if we were to decide the framework, there would have to be consultations with the various banking committees to talk about we've had this intense of discussion, we've done a lot of studies and this is why our interpretation of the dual mandate is that we're not following it optimally with the current framework.

MR. WESSEL: Thank you. Christian Deveaux.

MR. DEVEAUX: Thank you. So, I do very much agree that a careful thorough framework review inside the Fed would be a good thing at this point, but I think it also comes out from the statistic discussion, how different the political economy context is and the government's context. And there are clearly some risks involved in a higher profile, more open, more politically engaged process here that may not exist in Canada or at least not to the same degree. So, I just wanted to press, particularly, Eric. What is it that we cannot achieve by simply interpreting the existing symmetric target more aggressively?

MR. ROSENGREN: So let me start with -- I think there are costs to having a review and there are risks that instead of being a technical discussion it becomes a part of some political discussion. Seems like Bank of Canada gives us an example that, that doesn't necessarily have to happen. And I do think that there are also our costs to having the wrong framework and those costs are the ones that Larry Summers and others this afternoon discussed. So I think there are other ways that you can broaden it out. So, just for example, the example of taking an average over a longer period of time has some attributes of that. But it do think that it does help to actually talk about it in a public way; communicate it clearly. And whatever your framework is, it's going to make a difference for policy. So, if I'm picking a

five-year average or a one-year average or only looking forward, I'm going to have a different policy prescription. So, when I'm thinking about my monetary policy and what interest rates are optimal, it's within the framework that we adopt it in January.

So, if we had a price level target right now, I would not be recommending the same monetary policy prescription as the current framework that we have. So, to the earlier question that Christian was talking about, frameworks make a big difference because our policy path would be different depending on which framework we picked. And so, how much risk you're willing to take for inflation being above 2 percent or being above 2 percent for an extended period of time would depend on which of the various frameworks you thought was the appropriate framework. So, I think it is important to have a lot of agreement, not only on the committee, but more broadly with Congress and the public more generally about what the framework should be and then it's our responsibility to follow that framework even if it's not the framework that I personally would pick.

MR. WESSEL: So, one of the measures of a conference like this is that, I've learned that since coming to Brookings that afterwards people ask you, so what did you learn? And usually I have to think about this for a while afterwards to decide, but I think one of the things I've learned today is that there are moments at which asking questions like this feel really appropriate and this certainly seems to be such an appropriate moments. So, I want to thank all the large number of people who participated today and as I said, we hope to synthesize this because I have a feeling that as Ben Bernanke suggested earlier that this is a conversation that will be ongoing and probably with increasing volume over the next year-and-a-half or so.

Secondly, I'd like to thank the Hutchins Center staff, Kerry Grannis, Anna Dawson, Haowen Chen, Sage Belz, Vivien Lee and Mike Ng for helping us put this together. Mike did very nice explainer about some of these issues which are on our website. And finally, I want to thank all of you, particularly the people who sat here for over four hours to talk about monetary frameworks. You're my heroes.