
On September 24, 2008 the National Indian Gaming Commission posted our analysis of the Final Rule for 25 CFR Parts 502, et al., on their website. Our analysis was intended to update analyses performed by Dr. Meister of Analysis Group, Inc. The Oklahoma Indian Gaming Association commissioned Dr. Meister to review our analysis and he submitted his review to the Commission on November 10, 2008.

We have prepared the following responses (both generally and point-by-point) to assist the Commission and Commission staff in responding to any issues raised regarding our analysis or Dr. Meister's review of our analysis.

General Comments

- Dr. Meister's claim of lack of transparency in our analysis is merely asserted. It is certain that there are areas of this (or any other analysis) that could be clearer. However, without concrete examples, we have no way of addressing those areas where the analysis could be stated more clearly.
- With respect to the issue of the questionable or speculative nature of the assumptions used in the analysis, that is why they are called assumptions - not facts. Assumptions are provided and identified so that they can be contradicted by data or alternative assumptions that have better justification.
- It should be noted that many of the differences in assumptions between our analysis and the analyses and comments of Dr. Meister concern assumptions made about provisions of the proposed rule that were not promulgated.

That said, the three primary assumptions that account for the difference between Dr. Meister's analyses and that of the Policy Navigation Group are:

1. Dr. Meister's analysis assumes that 100 percent of the machines in operation are not in compliance with the proposed standards. As stated in our analysis, this assumption would be inconsistent with the stated intent of the NIGC. Therefore, we based our assumptions of baseline compliance on public statements made by the Chairman of the Commission. Unfortunately, neither of Dr. Meister's reports provides any concrete evidence that the Chairman's assessment is in error.
2. Dr. Meister's original analysis assumed that 100 percent of the Class II machines in operation in 2006 would remain in operation at the time the rule becomes effective and at the end of the five-year grandfathering period. This assumption is contradicted by real world data in Oklahoma and Florida and by predicted changes in California. As a result, Policy Navigation Group's analysis relies on trends in the existing data to predict the number of machines actually subject to the rule. The use of these trends

was tempered by judgment, but only to increase the number of Class II machines remaining in operation relative to the suggested trend line.

3. Dr. Meister's original analysis assumed a greater than 60 percent reduction in revenue per machine as a result of that portion of the regulation that was not finalized. Policy Navigation Group's analysis relied on the simultaneous operation of compliant and non-compliant versions of the same game to calculate its lower bound estimate of revenue losses due to these same provisions.

Assumptions Identified as "Speculative or Unjustified"

Below is the complete list of assumptions viewed as unjustified or speculative by Dr. Meister and our response to his comments. With respect to these comments Dr. Meister provided no alternative facts or assumptions to improve these assumptions - he merely highlighted them as questionable.

Comment: "A recent compact in Florida temporarily cleared the way for Class III machines in that state. Due to the additional revenue from Class III games, these conversions are expected to be complete before the expiration of the final rule's five year grandfather provisioning." (p. 3-5)

Response: At the time the report was drafted, the Seminole gaming facilities were moving toward conversion to Class III. It appears that they will continue to push for such a conversion rather than revert to Class II operations. However, if resolution of the legal issues drags on, a greater number of machines could be covered by some provisions of the rule. At this time, it is too soon to estimate the degree of overlap.

Comment: "We do not expect all Class II machines to be eliminated in Oklahoma ... we assume 25 percent of the number of 2006 Class II machines remain at the end of the grandfathering period." (p. 3-5)

Response: This was an assumption made specifically to address the concern raised by Dr. Meister and others that some level of Class II operations are likely to remain in Oklahoma due to an inherent demand for such games. This assumption put a lower bound on the number of machines that would be replaced (contrary to the evidence suggested by the recent rate of conversion from Class II to Class III in the state). Whether 25 percent is the best assumption remains to be seen. The real number is somewhere between zero percent and 60 percent since 40 percent of the machines had already been replaced by the time the report was drafted.

Comment: "The Oklahoma estimate for the future is first based on the annual rate of decline in the number of machines from 2006 to mid 2008. The number of Class II machines has fallen rapidly, by nearly 40 percent in less than two years. In the future, the rate is expected to

decline at a constant rate equal to the annualized rate experienced from 2006 to mid-2008.” (p. 3-6)

Response: In the absence of additional information, projecting behavior in the near future based on behavior in the recent past seems logical. As stated above, we stopped the decline at 25 percent of the existing stock to account for some baseline desire to operate machines under the authority of Class II.

Comment: “...it is not unreasonable to expect rapid growth to continue in other solely Class II states.” (p. 3-6)

Response: By freezing the universe of Class II machines in time, the February 2008 analysis overstated the effects of the rule in states where tribes are converting from Class II to Class III, but understated the potential effects in the remaining Class II states by not accounting for growth in those states over time. If we are incorrect in assuming that historical growth in Class II gaming will continue in states with no Class III alternative, then we have overestimated the costs of the rule.

Comment: “In those states with only Class II gaming, the growth of Class II games is estimated by averaging the number of new machines installed per year over the last five years (2002-2006). This past five-year average is used as the estimate for the annual average number of machines expected to be installed for the next ten years...” (p. 3-7)

Response: Again, we only have past history to rely on in predicting future behavior. This growth rate is used to estimate the baseline in the absence of the rule. To the extent that the rule increases costs, growth may slow in response.

Comment: “Because of the interrelated markets for Class II and Class III, this analysis assumes that the number of Class II gaming devices will remain steady in the next ten years in states with both Class II and Class III machines.” (p. 3-7)

Response: This assumption was based on observed behavior in states where tribes operate both Class II and Class III games. Class II activity seems to be prevalent when caps on Class III machines are binding constraints. However, those caps tend to be revised upward when compacts are renegotiated. Class II operations then decline. Since states with caps have different renegotiation schedules, we simply assumed that these variables average out over time. It should be noted that this assumption does not apply to California or to Oklahoma, as these states have a fixed number of Class II machines in both pre and post-rule scenarios.

Comment: “Both the NIGC and the Department of Justice have brought enforcement actions against alleged non-compliant tribal gaming operations in the past. Such enforcement will continue in the future with or without promulgation of a bright line standard defining Class II gaming. However, litigation costs, and other costs of remedying non-compliance, such as machine replacement, are likely to be higher in the absence of such a standard - particularly in the absence of a grandfathering provision that eases transition to full compliance.” (p. 3-10)

Response: Again, this assumption primarily affects the provisions of the rule that were not finalized. However, if there is some baseline noncompliance with the underlying statutory definition of Class II games (or the Federal government's understanding of that definition), it appears intuitively obvious that in most cases setting a bright line standard and allowing five years to achieve compliance will have lower transactions costs than individually suing facilities to achieve the same result.

Comment: "...in the absence of regulation, we expect the non-compliance rate to be lower than the current estimated rate of 50 percent, but not to be zero. Any quantitative estimate is speculative since it is a statement about the future. In our judgment, a reasonable estimate for the long-term non-compliance rate is 25 percent, or half of the current rate." (p. 3-15)

Response: This was an acknowledgement of the fact that the Federal government may not win all of its enforcement actions. The actual number could be higher or lower than 25 percent.

Comment: "... we would expect to see a slowing of play to result in a greater willingness to play." (p. 4-3)

Response: This assumption was not used in the quantitative analysis. It simply recognizes that there is a tension between a casino's desire to maximize return per machine and a player's desire to maximize time on machine.

Comment: "Using the rulemaking costs for a small rule and a non-controversial procedural amendment in the State of Minnesota as a proxy, the promulgation of new tribal rules to comply with Part 543.3 may range from \$7,754 - \$30,320 per tribe." (p. 4-4)

Response: Both the proxy and its use in the analysis are transparent so that Dr. Meister or any other commenter can provide suggestions for an alternative approach.

Comment: "If all of these regulators received additional training on the new MICS requirements (keeping in mind there is no need for such training for tribes in states where no Class II gaming is taking place) at a cost of \$100 per person - to account for materials and the time of the regulator, such training would add \$90,000 to the first year cost of the proposed rule." (p. 4-5)

Response: Again, this is an assumption - alternative assumptions or evidence are welcome.

Comment: "If we again assume a training cost of \$100 per employee, we calculate a training cost of \$3.7 million in the first year." (p. 4-6)

Response: Again, this is an assumption - alternative assumptions or evidence are welcome.

Comment: "... we assume that 50 percent of the machines covered by the rule at the end of the grandfathering period would have become compliant with the technical standards through replacement or upgrade during the grandfathering period." (p. 4-7)

Response: This comment goes to one of the fundamental points of disagreement between Policy Navigation Group's analysis and Dr. Meister's analysis. He assumes that 100 percent of machines will be non-compliant with the standard as proposed while Policy Navigation Group's analysis is based on the Commission's characterization that the purpose of the rule is to bring all machines up to a standard that is already operating and available in the Class II market.

Comment: "We assume that the remaining machines (approximately 12,000) will require some degree of modification in year five to meet all of the technical requirements. We assume that 6,000 of these machines will be nearly compliant, but will require minor modification to be 100 percent compliant. This assumption reflects the fact that the hardware associated with many of the minimum technology standards has become available over time and machines may already have some, but not all of the required hardware installed. For example, such a machine may meet all of the other standards, but require an installation of a door sensor, an upgrade of the money handling hardware, or sealing of the motherboard. For these systems we assume costs of \$500 per machine including parts and labor to make required modifications." (p. 4-7)

Response: The specific fraction of machines that will require moderate upgrade, no upgrade, or replacement are assumptions, and stated as such. Although an assumption, the price of a moderate upgrade is much higher than the observed cost of upgrading Megananza machines to Reel Time machines. This assumption, therefore, is anchored within the harbor of red world experience.

Comment: "We assume that 2,500 of the machines represent antiquated systems that are simply incompatible with full compliance with the technical standards. We are not certain that such systems exist, but at some point it becomes cheaper to replace a system than to upgrade. We assume a cost of \$6,000 per machine for a full replacement (see discussion of the classification costs for a full description of this estimate). This amount represents the cost of a player interface as well as potential replacement of some or all of the gaming system itself." (p. 4-8)

Response: The specific fraction of machines that fall into this category is an assumption that could be over or understated. The cost of a replacement, however, is based on the cost of compliant machines in the marketplace today.

Comment: "The remaining 3,500 machines are assumed to fall somewhere in the middle of these two extremes. Such machines may require multiple upgrades to become compliant, but not so many as to justify full replacement of the system. For these systems we assume a cost of \$2,500 per machine." (p. 4-8)

Response: The specific fraction of machines that fall into this category is an assumption that could be over or understated. The cost of a replacement, however, is based on the cost of compliant machines in the marketplace today.

Comment: “We used Reel Time’s revenues as a proxy for the 50 percent of machines that are assumed to be compliant and calculated the average revenues of non-compliant machine revenues necessary to achieve the average revenues per day in Class II States.” (p. 4-17)

Response: This assumption has two potential pitfalls. One, if Reel Time is not representative of other compliant machines (either more or less profitable) then the calculated average for non-compliant machines will be similarly non-representative. Two, the calculation inherently assumes that compliant machines are distributed uniformly across states and that certain tribes are not more or less likely to be operating machines that do not comply with the proposed standards. Neither of these potential errors are sources of bias in the estimates.

Comment: “For small changes in gaming revenue, non-gaming revenue may not be affected. A one or two percent change in willingness to pay for gambling does not mean that a consumer will stay fewer nights or eat fewer meals. These transactions are inherently “lumpier” than spending on gambling.” (p. 4-19)

Response: This is not an assumption used in the analysis, but a caveat to the results. While this statement makes intuitive sense, it is not used in the calculation of non-gaming revenue losses. Policy Navigation Group used the same methodology as Dr. Meister did to calculate non-gaming revenue losses.

Comment: “Considering that Indian gaming operations handle significant amounts of cash in their daily operations, it is reasonable to assume that fraud levels could be similar to those in the banking/financial services sector.” (p. 5-3)

Response: Even in the banking and financial sectors a significant portion of the losses come from petty theft associated with money handling rather than elaborate embezzlement schemes. This same statement would be true of other gaming operations. If anything, by reputation, one could assert that gaming operations are even more subject to attempts at theft and fraud. However, we assumed they were no more susceptible than any other large cash-based business.

Comment: “Assuming a seven percent fraud and corruption rate, [Class II] gaming facilities could lose approximately \$250 million per year.” (p. 5-7)

Response: According to the Association of Certified Fraud Examiners, fraud and corruption rates in U.S. organizations range from 12.6 to 26.9 percent in average. As mentioned above, one can assert that gaming operations are also subject to fraud and corruption and therefore, the estimate provided seems to be reasonable. Alternative assumptions or evidence are welcome (though absent from Dr. Meister’s comments).

Responses to Additional Information Supplied by Dr. Meister

Dr. Meister did provide additional information on some of the assumptions used in the Policy Navigation Group analysis. Those comments are addressed below:

Comment: “Over time Florida and most Oklahoma facilities are expected to become fully Class III facilities.” (p. 3-2) - The future direction of Florida is still uncertain as the Seminole Tribe of Florida’s gaming compact has been ruled invalid by the Florida Supreme Court, the State Legislature considers the compact with the Tribe, the State Attorney General pushes for the NIGC to shut down the Tribe’s Class III gaming in light of the Court’s ruling, the Tribe’s attempts to obtain Secretarial Procedures continues to be held up, and the pursuit of Secretarial Procedures by tribes elsewhere (e.g., Texas) continue to be unsuccessful thus far. Meanwhile, the Miccosukee Tribe of Indians has not attempted to get a gaming compact with the State or pursue Secretarial Procedures. In Oklahoma, despite the ability to offer some Class III machines for a few years now, there are still a large number of Class II machines in operation.

Response: It is true that the situation in Florida remains unresolved. However, it appears that the Seminole still have every intention of resolving this issue in favor of converting to Class III as soon as possible. Until the tribe is completely thwarted or gives up on this effort, we find that it is as reasonable to assume that they will be successful as to assume that they will not. To the extent that the Miccosukee Tribe does not intend to pursue Class III gaming, the Policy Navigation Group analysis would understate the number of Class II machines still in operation in Florida. Tribes that are currently operating in other states under Class II authority (e.g., Texas) were included in the baseline as Class II and not affected by assumptions regarding conversion in Florida, Oklahoma, and California. As for Oklahoma, the Policy Navigation Group analysis assumes a significant level (25 percent) of machines in that state will continue to be operated under Class II authority.

Comment: “...operators remove virtually all of their Class II machines when they have the legal option to install Class III machines.” (p. 3-5) - This is not the case. Tribes in some states still operate Class II machines even though Class III machines have been offered elsewhere in their state, in many cases for years (e.g., Oklahoma, Florida [Miccosukee Tribe; and Seminole Tribe being contested], California [Lytton Band], New York, Montana, and Arizona).

Response: There are obvious exceptions to the generalization; however, migration to Class III appears to remain the rule. The Policy Navigation Group analysis accounts for the Lytton Band and a likely residual Class II presence in Oklahoma. As stated above, it neglects to account for the Miccosukee tribe. In some of the other states tribes continue to operate Class II games, but under the provisions of their Class III compact. As a result, the new rules would not apply.

Comment: “We continue assuming Florida will convert to Class III machines, recognizing that this assumption may understate the costs of the rule if a new compact and conversion is not concluded before the end of the grandfathering period.” (pp. 3-5 -3-6)

Response: Although the situation in Florida is unresolved, it appears that the Seminole have every intention of resolving this issue in favor of converting to Class III as soon as possible. Until the tribe is completely thwarted or gives up on this effort, we find that it is as reasonable to assume that they will be successful as to assume that they will not.

Comment: "Annual growth rates for the industry have been over ten percent a year for many years." (p. 3-6) - In recent years, the growth of Indian gaming has slowed down significantly. In 2006, the growth rate was about 10 percent. In 2007, the growth rate dropped to approximately 5 percent. And growth appears to be slowing down further in 2008.

Response: Both the statement in the analysis and the comment are true. The net affect of not reducing growth rates in the analysis is to overstate the cost to tribes, since slower growth rates result in fewer machines complying with the new standards in the future.

Comment: "Since Class III machines can be more lucrative for both states and tribes, we assume that states and tribes eventually recognize the advantages of lifting caps to meet growing demand for gaming." (p. 3-7) - This is a very speculative assumption for the future given that it has not proven true in many states.

Response: It seems to have proven true in states that have Class III compacts. It seems less true when states and tribes are negotiating their initial compact.

Comment: "We assume that 2,500 of the machines represent antiquated systems that are simply incompatible with full compliance with the technical standards ... We assume a cost of \$6,000 per machine for a full replacement ... This amount represents the cost of a player interface as well as potential replacement of some or all of the gaming system itself." (p. 4-8) - Note that per Appendix C, a more accurate estimate of the average cost of replacing a Class II interface is \$10,000. This does not include software development costs.

Response: There are two estimates of the replacement costs for noncompliant Class II machines. The February 2008 report estimates the costs by identifying the costs of building the components of compliant machines - the interface, title software, etc. The source of this data is communications with Class II manufacturers. The advantage of this data source is the likely expertise of the respondents. The disadvantage is that the public has no means to determine the accuracy, precision, and bias in either the data collection method or the actual data.

In the Policy Navigation Group analysis, the total cost of a new, compliant Class II machine was estimated to be \$5,400 in current dollars. The source of this estimate is the public statements disclosed to investors by officers of a publicly-traded company as part of their Security Exchange Commission regulatory compliance. The advantage of this data source is that it is transparent, verifiable, and comprehensive. The disadvantage is that it may be biased since it is the experience of only one company. Policy Navigation Group also assumes that tribal gaming organizations are rational economic actors - they would not pay more to convert their existing Class II games than the cost of buying a new compliance Class II game.

Therefore, the effective market limit to replacement costs (including all of component software development, interface, and other costs) is approximately the cost of a new system.

The November 2008 report states that its estimate is “more accurate.” Without more information on the sample methodology of the \$10,000 estimate, it is impossible for us to determine whether \$5,400 or \$10,000 is more accurate. Since paying \$10,000 would appear to be economically irrational, we used the \$5,400 estimate and cited its derivation.

Comment: “[...][the Cost-Benefit Study] analysis finds that the grandfathering provision will reduce compliance costs substantially.” (p. 4-22) - It is my understanding that this conclusion is based upon the assumption that Class II systems only have a five year life cycle (see the ninth major bullet below under Biased assumptions). Based upon my research and discussions with various manufacturers, Class II software, player interfaces, and titles are not replaced on a typical Class III machine life cycle, which is five years. Software and player interfaces are typically only replaced or modified if they are damaged or switched out with a new system, which is not all that often.

Also, relative to the number of total player interfaces (50,000 plus), there are not a lot of available titles. Thus, titles are not often retired or discarded by Class II system manufacturers.

Response: The Policy Navigation Group analysis is based on a ten year replacement cycle.

Responses to Assertions that Assumptions are Biased toward Minimizing Costs

Dr Meister raised concerns that other assumptions were biased toward minimizing costs. These comments are addressed below:

Comment: “Since game manufacturers are already familiar with the types of requirements contained in the technical standards due to their operation in other markets, we do not assign an increase in development costs to this rule.” (p. iii) - Familiarity with the requirements does not mean there would not be costs associated with implementing them. In fact, based upon data independently gathered from gaming machine manufacturers, there are increased costs of implementing the technical standards (see Appendix C for the estimated Class II interface upgrade costs related to the technical regulations and MICS).

Response: The Policy Navigation Group analysis did not suggest that technical standards do not have a cost associated with implementation. What the quoted language above says is that there are assumed to be no additional development costs associated with designing machines that meet the technical requirements. For example, in designing a new player interface, there will be no additional development costs associated with the security of the enclosure, since manufacturers already know how to make a secure enclosure for a gaming machine.

Comment: “Since we also have no reason to believe that certifiable machines will be inherently more expensive than machines already on the market, we have not included a cost to account for increased manufacturing costs.” (p. iii) - Even if machines are not more expensive, this does not mean that there would not be costs associated with implementing the proposed technical standards. Some Class II systems will need to be wholly replaced in order to make them compliant with the proposed standards, and there are costs of doing so. These replacement costs are incremental costs of the proposed regulations that must be accounted for as a negative impact on tribes (see Appendix C for estimated Class II interface replacement costs related to the technical regulations and MICS.)

Response: Again the Policy Navigation Group analysis does not say that there will be no costs associated with replacing or upgrading machines. It says that the machines that are replaced will be replaced with machines that are no more expensive than those already available on the market.

Comment: “...we evaluate alternative scenarios in estimating the costs of changes to the classification standards. We evaluate the revised proposal baseline that includes increased enforcement of existing standards.” (p. iv) - This increased enforcement baseline is not appropriate for an analysis of the impacts of the proposed Class II gaming regulations. First, this baseline assumes that the “existing standards” can be legally interpreted as desired by the NIGC even though I understand that there has not been a legally ruling to this effect. Second, the increased enforcement baseline assumes that there are Class II systems that are illegal even though I understand that there has been no legal ruling to this effect. Third, there is no historical basis for this increased enforcement baseline - the NIGC has not been willing or able to increase enforcement of the Class II systems it believes do not meet the definition of Class II. In fact, the past inability or unwillingness to increase enforcement is what led the NIGC to the proposed regulations in the first place.

Response: [Note classification standards are not part of the final rule, though they are part of the analysis.] First, the Commission intended the classification standards to clarify how they currently interpret the statutory language in light of case law. So it is a perfectly reasonable legal baseline. Second, if there are no illegal systems, then both analyses are moot since no one would be required to make any changes to comply. Third, as stated previously, one of the motivations for promulgating a classification standard is to avoid the transactions costs associated with case-by-case enforcement.

Comment: “Without justification, the Cost-Benefit Study spreads out various negative impacts across a 10-year period rather than allowing them to be entirely accounted for in the years in which they are actually incurred.

- Cost of modifying machines (p. iv, 4-7 - 4-8);
- Lost gaming revenue (pp. v and 4-17);
- Lost non-gaming revenue (pp. v and 4-19 - 4-20);
- Lost jobs (pp. iv-v and 4-19);

-
- Regulatory costs (pp. 4-4 - 4-5);
 - Machine replacement, conversion, and reprogramming costs (p. 4-11 - 4-15); and
 - Total cost of the proposed regulations (pp. 4-6, 4-21, and 4-22 - 4-23).
 - This allocation over 10 years has the effect of artificially decreasing the true *annual* negative impacts on tribes."

Response: Annualization of costs and benefits is standard practice in regulatory cost benefit analysis and does not decrease the impact on the tribes in any way. While reporting costs in this way can mask years where there is a particular spike in costs or benefits, it appropriately reduces costs in the future to reflect the time value of money. However, it allows an easier comparison of alternatives by putting the stream of costs and benefits into the same units.

Comment: "... systematic data is [sic] not available to inform a determination of the baseline level of compliance. We then considered expert opinion on this question. Public statements by the Commission give an estimate that 50 percent of current Class II machines would not be in compliance with the classification and definitional standards." (p. 3-9) - This contradicts information I independently gathered from gaming machine manufacturers, both now and at the time of the completion of my February 2008 Study.

Response: There is an obvious disconnect between what the Commission says it is trying to achieve and what the manufacturers are telling Dr. Meister the rule would do. This gap is not an analytical question.

Comment: "We assume that software and accounting requirements will be addressed through the frequent and routine updates required as part of normal operations during the grandfathering period. However, we assume that physical requirements ... could take longer to implement through normal turnover and maintenance." (p. 4-7) - Based upon data independently gathered from gaming machine manufacturers, there are increased costs of implementing the technical standards, beyond what might normally be done (see Appendix C for the estimated software development costs and interface upgrade/replacement costs related to the technical regulations and MICS).

Response: The Policy Navigation Group analysis does not claim that technical standards do not have a cost associated with implementation, but rather that there are assumed to be no additional development costs associated with designing machines that meet the technical requirements. For example, in designing a new player interface, there will be no additional development costs associated with the security of the enclosure, since manufacturers already know how to make a secure enclosure for a gaming machine.

Comment: "...it is not appropriate to attribute the entire cost of upgrading these systems to the rule, since these changes would eventually occur anyway. The appropriate measure of social cost is the loss in value associated with the acceleration of these modifications relative to the baseline. However, in the interest of both simplicity and conservatism, we attribute

the entire cost of modification of systems in year five to the rule. For the purposes of this analysis, we assume that 50 percent of the machines covered by the rule at the end of the grandfathering period would have become compliant with the technical standards through replacement or upgrade during the grandfathering period." (p. 4-7) - This contradicts information I independently gathered from gaming machine manufacturers, both now and at the time of the completion of my February 2008 Study.

Response: We assume the information Dr. Meister is referring to is the notion that 100 percent of machines are non-compliant. Since the Commission has issued rulings on systems that are compliant, this information cannot be accurate.

Comment: "For purposes of the classification standard, it is assumed that all systems are compliant at the end of the grandfathering period. This is because the changes necessary to comply with the classification standard tend to be software changes that occur more frequently than changes in hardware." (p. 4-7) - This assumption is incorrectly made because it based upon Class III machine life cycles of five years, which do not apply to Class II machines.

Response: This assumption does not rely on Class III replacement rates but on software maintenance that tends to occur more frequently than system replacement.

Comment: "In its proposal, the Commission estimated that systems have a five year useful life ... Since the classification standards can be met with mostly software changes, the grandfathering provisions should obviate most, if not all, costs associated with reprogramming or replacement." (p. 4-13) - This contradicts information I independently gathered from gaming machine manufacturers, both now and at the time of the completion of my February 2008 Study.

Response: Dr. Meister does not mention how this information contradicts the information he gathered or how his information can be independently verified by the public. Since many of the changes required to meet new classifications standards will involve only software changes (which occur frequently anyway), the five-year grandfathering provision should allow gaming facilities to update their software within a timeframe already consistent with reprogramming schedules. Moreover, the analysis was based on a ten-year turnover rate, rather than five years.

Comment: "If NIGC does not proceed with a regulation to change the classification standards, tribes will also face conversion costs as enforcement actions lead to forced conversion to compliant machines." (p. 4-15) - First, if the NIGC pursues enforcement actions to force compliance with the proposed classification standards, I understand that it will be met with legal challenges by tribes. If this is the case, then "conversion costs" will only be incurred if the tribes' legal challenges fail. Given that gaming machine classifications resulting from litigation have tended to go in the tribes' favor, there is at best a great deal of uncertainty regarding the likelihood of the NIGC's success in legal challenges. Second, if there were such certainty regarding the potential success of enforcement actions by the NIGC, then why has the NIGC not pursued this avenue before? Third, these conversion costs are not relevant in the

analysis of the impact of the proposed regulations. They are not costs that would be incurred if the proposed regulations were enacted, but rather costs that would be incurred if the proposed regulations were *not* enacted. And in the only relevant analysis in which we compare the current regulatory situation to that which would exist under the proposed regulations, we are only interested in the costs that would be incurred if the proposed regulations were enacted.

Response: First, tribes have both won and lost cases in this area. The analysis assumes that increased enforcement would not be 100 percent effective - actually assumes about a 50-50 split between tribes and enforcement agencies. Second, the NIGC tries to act in the interest of the tribes - their goal is not to maximize costs to the tribes but to protect the integrity of the legal system under which the tribes and all US residents operate. As such, promulgation of a standard was seen as a lower cost course of action than pursuing multiple enforcement actions. Third, Dr. Meister is correct that litigation costs are not costs of the regulations. They are costs that would be incurred in the absence of the regulations, which would be avoided as a result of the regulations. Avoided costs can be a measure of social benefits.

Comment: "NIGC determined that case-by-case litigation was not the least costly path to compliance. Switching to regulation it finds is likely to have lower transaction costs for the agency, tribal gaming operations, tribal regulatory authorities, game manufacturers, and other stakeholders." (p. 5-8) - If/when the proposed regulations are enacted, lawsuits are expected to be filed by tribes against the NIGC. So the NIGC would not be avoiding all litigation costs. These litigation costs associated with the enactment of the proposed regulations are not identified or measured in the cost-benefit study.

Response: PNG agrees with the fact that the litigation costs associated with the enactment of the proposed regulations were not identified or measured in the August 2008 study. PNG also recognizes that the cost of modifications to meet the technical standards may have been underestimated. However, no alternative data or information on what needs to be updated to meet such standards was provided in the Economic Assessment of the Cost-Benefit Study.

Responses Related to Omission or Minimization of Negative Impacts on Tribes

Comment: "Some of the negative impacts quantified in my February 2008 Study were not quantified in the Cost-Benefit Study. In addition to omitting some of the quantifiable and unquantifiable negative impacts, some of the negative impacts on tribes were also inappropriately minimized in the Cost-Benefit Study. Each of these omissions and minimizations of individual negative impacts has the effect of underestimating the total overall impact of the proposed Class II regulations. Set forth below are the negative impacts on tribes that are omitted or minimized in the Cost-Benefit Study:"

Impacts not considered:

- Decrease in the variety and quality of Class II gaming machines;
- Gaming facility closures;

-
- Increase in gaming machine deployment costs (for upgrades and replacements);
 - Increase in financing costs;
 - Decrease in innovation in the Class II gaming machine market;
 - Restriction of new entry into the Class II machine market; and
 - Changes in competition.

Response: The determination of whether a rule is “major” or significant is based on social costs, so most of the multiplier effects listed in the assessment of the August 2008 economic analysis would be excluded from the \$100 million determination. PNG’s analysis did not exclude consideration of other significant criteria. It was simply found that the effects would not be significant for the purposes of the study.

Responses Related to Assertions that Impacts were Minimized

Comment: “The result of this situation was that both machines [MegaNanza and Reel Time] were in operation in significant numbers (about 3,000 of one machine and 1,000 of the other machine) in roughly the same market at the same time. Therefore, by looking at the relative revenues of these two systems over the same time period, we should be able to determine how large the net revenue difference between compliant and non-compliant bingo machines might be ... Therefore, the net loss in revenue associated with the replacement of these non-compliant machines with a compliant alternative is somewhere between zero percent and 2.5 percent.” (p. 4-16) - Per discussions with Multimedia, this comparison between MegaNanza and Reel Time over the chosen time period yields an inaccurate measure of the difference in machine performance because there was an ongoing transition from MegaNanza to Reel Time, and this transition was completed for the largest, best performing gaming facilities first. Thus, at the date chosen in the Cost-Benefit Study, the larger, better performing gaming facilities were already operating Reel Time, the lower revenue generating machine, while smaller, lower revenue generating facilities were still operating MegaNanza, the higher revenue generating machine. This is why the Cost-Benefit Study found such a smaller difference in performance of the two machines (2.5 percent). I understand that the real difference in performance, when properly measured, is many times larger than that computed in the Cost-Benefit Study. In fact, it is more akin to the difference between compliant and noncompliant machine performance computed in my February 2008 Study.

Response: PNG disagrees with the assertion in the Economic Assessment of the Cost-Benefit Study that this method is an inaccurate measure of the difference between machine performances, given the fact that there was an ongoing transition from MegaNanza to Reel Time. According to the November 2008 Economic Assessment, the best performing gaming facilities started replacing their machines with the lower revenue generating machines first (rather than the least performing facilities). PNG finds that this claim is diametrically opposed to the minutes of the investor calls that were reviewed to conduct the economic analysis, and to common sense. If a loss is to be

expected, it would be more rational to start replacing the least profitable machines first, instead of the most profitable machines. Therefore, if anything, the PNG methodology overstates the revenue loss, since the most profitable non-compliant machines are being compared to the least profitable compliant machines.

Comment: “We used Reel Time’s revenues as a proxy for the 50 percent of machines that are assumed to be compliant and calculated the average revenues of non-compliant machine revenues necessary to achieve the average revenues per day in Class II States.” (p. 4-17) - See comment above regarding the inappropriate use of Reel Time data.

Response: This assumption has two potential pitfalls. One, if Reel Time is not representative of other compliant machines (either more or less profitable) then the calculated average for non-compliant machines will be similarly non-representative. Two, the calculation inherently assumes that compliant machines are distributed uniformly across states and that certain tribes are not more or less likely to be operating machines that do not comply with the proposed standards. Neither of these potential errors are sources of bias in the estimates.

Responses Related to Mischaracterizations of Results from February 2008 Report

Comment: “First, the Cost-Benefit Study claims that my February 2008 Study primarily considers the worst case scenario in terms of the overall impact of the proposed Class II gaming regulations. This is patently false. In my study, I present three scenarios for many of the negative impacts of the proposed regulations: one yields a very conservative estimate of the impact; another yields a very aggressive estimate; and the third yields a moderate estimate between the conservative and aggressive estimates. And it is this moderate scenario that I considered to be the most likely outcome if the proposed regulations were enacted. Furthermore, as previously noted, there are a number of negative impacts on tribes that were not quantifiable or lacked sufficient data for a quantitative analysis. Thus, the total of the impacts that I quantified would be conservative and should serve as the lower bound of the total impact.”

Response: PNG considered Dr. Meister’s earlier analyses to represent worst-case scenarios since they were based on known overestimates of affected machines in Oklahoma and the assumption that there were no compliant machines in operation or on the market, in spite of Commission rulings to the contrary. We did not mean to assert that he only chose the worst of his worst case analyses.

Comment: “Second, in characterizing my estimate of lost gaming revenue, the Cost-Benefit Study states that annualized loss to tribes is \$160 million. They arrive at this number by spreading my annual estimated gaming revenue loss of \$1.2 billion over 10 years and then discounting back to current dollars. However, as clearly stated in my report, the \$1.2 billion gaming revenue loss is an annual figure. Therefore, there is no need to annualize it as done in the Cost-Benefit Study. And the net effect of the annualization is to grossly understate my estimate of this negative impact of the proposed regulations.”

Response: PNG agrees with this comment. This figure was exclusively used to present a comparison between the August 2008 and the February 2008 analyses. Therefore, this issue does not affect in any way the legitimacy of the estimates or conclusions in PNG's report. PNG submitted a revision of this section of the analysis to the NIGC to reflect this change.

Responses Related to Lack of an Adequate Basis for Determining whether the Proposed Regulations are a Major Rule

Comment: "...In the Cost-Benefit Study, it is concluded that the proposed Class II regulations are not a major rule. 12 The basis for this conclusion is solely that the total impact of the proposed regulations on the economy is less than \$100 million. However, this does not provide an adequate basis for determining whether the proposed regulations are a "major rule" within the meaning of the Small Business Regulatory Enforcement Fairness Act..."

- "The Cost-Benefit Study does not account for the potential negative secondary economic effects (i.e., the "multiplier effects") that would come about as a result to the direct negative impacts on tribes.¹³ Secondary effects would include loss revenue to businesses that are supported by Indian gaming, lost wages to employees at Indian gaming facilities and other businesses supported by Indian gaming, lost jobs at Indian gaming facilities and other businesses supported by Indian gaming, and lost tax revenues paid by employees and businesses supported by Indian gaming. For Indian gaming, the multiplier effect is approximately two to three times the net direct impact of the proposed regulations (the negative impact on tribes after accounting for any substitution effects)".

Response: With regards to the argument that the promulgated rule might have been subject to the Congressional Review Act criteria, it is important to mention that even with all the limitations cited in the Economic Assessment of the Cost-Benefit Study, the total costs of the rule are very unlikely to exceed \$100 million in any given year. Since the Act references Office of Information and Regulatory Affairs' (OIRA) determination, and since OIRA's determination is based on social costs, most of the multiplier effects listed in the assessment of the August 2008 economic analysis would be excluded from the \$100 million determination. PNG's analysis did not exclude consideration of other significant criteria. It was simply found that the effects would not be significant for the purposes of the study.

Comment: "The second reason that the Cost-Benefit Study does not provide an adequate basis for determining whether the proposed regulations are a "major rule" is that...it does not directly consider the second or third parts of the definition, parts (B) and (C).

In terms of part (B) of the major rule definition, there will be a major increase in costs to tribal governments, including but not limited to:

-
- Capital, deployment, and compliance costs related to new and upgraded Class II gaming systems;
 - Tribal regulatory costs;
 - Training costs;
 - Revenue sharing costs;
 - Financing costs;
 - Increased NIGC costs; and
 - Increased cost of contracting certified public accountants.

Response: PNG's analysis explicitly includes all of the costs enumerated above in the determination of whether the rule is major - with the exception of financing costs. The analysis argues that financing costs will decrease due to increased legal certainty - representing a benefit rather than a cost of the rule. PNG's analysis did not exclude consideration of other significant criteria. It was simply found that the effects would not be significant for the purposes of the study.

Comment: In terms of part (C) of the major rule definition, there will be significant adverse effects on competition, employment, investment, and innovation:

- If the proposed Class II regulations are enacted, competition for Class II gaming is likely to be adversely affected. The degree of competition is likely to be reduced for two reasons: 1) new entry would be restricted, and 2) as some Class II gaming facilities shut down or migrate to Class III gaming, there will be fewer Class II facilities, fewer upgrades to existing facilities, and few developments of new facilities.
- As a result of decreased revenues and/or increased costs for Class II operations, there is likely to be decreased employment at those operations. If operations are forced to shut down, these losses would be even greater. Also, given the often high percentage of Native American employees at Indian gaming facilities, there is likely to be a sizable impact on workers of Native American descent.
- Decreased revenues and/or increased costs would reduce the profitability of Class II gaming, thus making it difficult to obtain financing to invest in expansions of existing gaming facilities and the construction of new gaming facilities.
- The proposed regulations are likely to stifle innovation in the Class II gaming machine market, thus leading to a decrease in the variety and/or quality of Class II systems at Indian gaming facilities."

Response: PNG's analysis did not exclude consideration of other significant criteria. It was simply found that the effects would not be significant for the purposes of the study.

Responses to Issues where Alternative Cost Estimates were Proposed

Comment: “We assume that 2,500 of the machines represent antiquated systems that are simply incompatible with full compliance with the technical standards ... We assume a cost of \$6,000 per machine for a full replacement ... This amount represents the cost of a player interface as well as potential replacement of some or all of the gaming system itself.” (p. 4-8) – Note that per Appendix C, a more accurate estimate of the average cost of replacing a Class II interface is \$10,000. This does not include software development costs.

Response: There are two estimates of the replacement costs for noncompliant Class II machines. The February 2008 report estimates the costs by identifying the costs of building the components of compliant machines – the interface, title software, etc. The source of this data is communications with Class II manufacturers. The advantage of this data source is the likely expertise of the respondents. The disadvantage is that the public has no means to determine the accuracy, precision, and bias in either the data collection method or the actual data.

In the Policy Navigation Group analysis, the total cost of a new, compliant Class II machine was estimated to be \$5,400 in current dollars. The source of this estimate is the public statements disclosed to investors by officers of a publicly-traded company as part of their Security Exchange Commission regulatory compliance. The advantage of this data source is that it is transparent, verifiable, and comprehensive. The disadvantage is that it may be biased since it is the experience of only one company. Policy Navigation Group also assumes that tribal gaming organizations are rational economic actors – they would not pay more to convert their existing Class II games than the cost of buying a new compliance Class II game. Therefore, the effective market limit to replacement costs (including all of component software development, interface, and other costs) is approximately the cost of a new system.

The November 2008 report states that its estimate is “more accurate.” Without more information on the sample methodology of the \$10,000 estimate, it is impossible for us to determine whether \$5,400 or \$10,000 is more accurate. Since paying \$10,000 would appear to be economically irrational, we used the \$5,400 estimate and cited its derivation.

Comment: “Since game manufacturers are already familiar with the types of requirements contained in the technical standards due to their operation in other markets, we do not assign an increase in development costs to this rule.” (p. iii) – Familiarity with the requirements does not mean there would not be costs associated with implementing them. In fact, based upon data independently gathered from gaming machine manufacturers, there are increased costs of implementing the technical standards (see Appendix C for the estimated Class II interface upgrade costs related to the technical regulations and MICS).

Response: The Policy Navigation Group analysis did not suggest that technical standards do not have a cost associated with implementation. What the quoted language above says is that there are assumed to be no additional development costs associated with designing machines

that meet the technical requirements. For example, in designing a new player interface, there will be no additional development costs associated with the security of the enclosure, since manufacturers already know how to make a secure enclosure for a gaming machine.

Comment: “Since we also have no reason to believe that certifiable machines will be inherently more expensive than machines already on the market, we have not included a cost to account for increased manufacturing costs.” (p. iii) - Even if machines are not more expensive, this does not mean that there would not be costs associated with implementing the proposed technical standards. Some Class II systems will need to be wholly replaced in order to make them compliant with the proposed standards, and there are costs of doing so. These replacement costs are incremental costs of the proposed regulations that must be accounted for as a negative impact on tribes (*see* Appendix C for estimated Class II interface replacement costs related to the technical regulations and MICS).

Response: Again the Policy Navigation Group analysis does not say that there will be no costs associated with replacing or upgrading machines. It says that the machines that are replaced will be replaced with machines that are no more expensive than those already available on the market.

Comment: “We assume that software and accounting requirements will be addressed through the frequent and routine updates required as part of normal operations during the grandfathering period. However, we assume that physical requirements ... could take longer to implement through normal turnover and maintenance.” (p. 4-7) - Based upon data independently gathered from gaming machine manufacturers, there are increased costs of implementing the technical standards, beyond what might normally be done (*see* Appendix C for the estimated software development costs and interface upgrade/ replacement costs related to the technical regulations and MICS).

Response: The Policy Navigation Group analysis does not claim that technical standards do not have a cost associated with implementation. But rather there are assumed to be no additional development costs associated with designing machines that meet the technical requirements. For example, in designing a new player interface, there will be no additional development costs associated with the security of the enclosure, since manufacturers already know how to make a secure enclosure for a gaming machine.

Comment: “The total cost of upgrading and replacing systems to comply with the technical standards, therefore, is \$25.5 million. All of these costs occur in the fifth year after the effective date of the rule. The annualized cost at a discount rate of seven percent is roughly \$2.6 million.” (p. 4-8) - Note that per Appendix C, a more accurate estimation of the cost of upgrading and replacing Class II systems is \$50 million (*see* Total Capital Costs), and total capital, deployment, and compliance costs would be approximately \$54 million.

Response: There are two estimates of the replacement costs for noncompliant Class II machines. The February 2008 report estimates the costs by identifying the costs of building the components of compliant machines - the interface, title software, etc. The source of this

data is communications with Class II manufacturers. The advantage of this data source is the likely expertise of the respondents. The disadvantage is that the public has no means to determine the accuracy, precision, and bias in either the data collection method or the actual data.

In the Policy Navigation Group analysis, the total cost of a new, compliant Class II machine was estimated to be \$5,400 in current dollars. The source of this estimate is the public statements disclosed to investors by officers of a publicly-traded company as part of their Security Exchange Commission regulatory compliance. The advantage of this data source is that it is transparent, verifiable, and comprehensive. The disadvantage is that it may be biased since it is the experience of only one company. Policy Navigation Group also assumes that tribal gaming organizations are rational economic actors - they would not pay more to convert their existing Class II games than the cost of buying a new compliance Class II game. Therefore, the effective market limit to replacement costs (including all of component software development, interface, and other costs) is approximately the cost of a new system.

The November 2008 report states that its estimate is "more accurate." Without more information on the sample methodology of the \$10,000 estimate, it is impossible for us to determine whether \$5,400 or \$10,000 is more accurate. Since paying \$10,000 would appear to be economically irrational, we used the \$5,400 estimate and cited its derivation.

Comment: "As an upper-bound, we use the cost of producing a new Reel Time Bingo machine. This machine is available and has been determined to be compliant. The cost of producing such a machine was \$5,000 in 2003. Inflating this to current dollars we get an upper bound replacement cost of about \$5,400. We increase the estimate to \$6,000 to account for other potential costs, such as training for tribal facility operators." (p. 4-13) - Note that per Appendix C, a more accurate estimate of the average cost of replacing a Class II interface is \$10,000. This does not include software development costs.

Response: There are two estimates of the replacement costs for noncompliant Class II machines. The February 2008 report estimates the costs by identifying the costs of building the components of compliant machines - the interface, title software, etc. The source of this data is communications with Class II manufacturers. The advantage of this data source is the likely expertise of the respondents. The disadvantage is that the public has no means to determine the accuracy, precision, and bias in either the data collection method or the actual data.

In the Policy Navigation Group analysis, the total cost of a new, compliant Class II machine was estimated to be \$5,400 in current dollars. The source of this estimate is the public statements disclosed to investors by officers of a publicly-traded company as part of their Security Exchange Commission regulatory compliance. The advantage of this data source is that it is transparent, verifiable, and comprehensive. The disadvantage is that it may be biased since it is the experience of only one company. Policy Navigation Group also assumes that tribal gaming organizations are rational economic actors - they would not pay more to convert their existing Class II games than the cost of buying a new compliance Class II game.

Therefore, the effective market limit to replacement costs (including all of component software development, interface, and other costs) is approximately the cost of a new system.

The November 2008 report states that its estimate is “more accurate.” Without more information on the sample methodology of the \$10,000 estimate, it is impossible for us to determine whether \$5,400 or \$10,000 is more accurate. Since paying \$10,000 would appear to be economically irrational, we used the \$5,400 estimate and cited its derivation.

Responses to Comments Related to Analytical Difficulties Neither PNG nor Dr. Meister were Successful in Overcoming

Comment: “There is a marginal increase in the cost of pull-tabs (electrons are cheaper than paper), however this cost is not quantified in the analysis.” (p. 2-9)

Response: The issue of whether pull tabs require paper has already been resolved in court in a way that requires paper tabs to be a part of the game. As a result any marginal increase in the cost of playing pull tabs is not a result any final rule clarifying the classification standards.

Comment: “Manufacturers with systems that do not comply with Part 546 would be unable to sell these systems into the market after 120 days and could have stranded capital.” (p. 2-10)

Response: While this issue largely regards the portion of the rule not finalized, this is potentially a true statement. However, sunk costs are not relevant to prospective economic decisions. Further, it is unknown the extent to which such capital is stranded or in need of further modification to be viable again in a post rule market.

Comment: “543.7 What are the minimum internal control standards for bingo? This section describes the MICS for bingo cards, draws, manual payouts and short pays, operational controls, gaming equipment, voucher systems, patron accounts and cashless systems, promotions, and accounting ... A number of the updated requirements contain additional requirements to bring the MICS up to industry standards. Since the actual cost of these marginal changes is hard to estimate, the analysis does not assign a cost to these provisions.” (p. 2-11)

Response: This is a potential limitation of the analysis and is stated as such. We do not think the limited changes to these sections represent significant sources of cost to tribes or manufacturers.

Comment: “Security: Section 543.7 lists all of the new procedures necessary for the MICS. Some of these requirements are clarification of authorities already in parts of 542. Others may be similar to or consistent with standards already applicable through tribal regulation. While many of them have the potential to impose additional costs, we do not have sufficient information to develop a reasonable approximation of the total marginal effect of these changes.” (p. 4-6)

Response: Again this is a potential limitation of our analysis. Developing a reasonable estimate of these costs would require an understanding of security procedures already in place at each tribally owned gaming facility. This lack of data explains why neither our analysis, nor any of the analyses performed by Dr. Meister, tried to estimate the marginal costs of Section 543.7.

Comment: “We did not have adequate data to prepare a full quantitative assessment of the potential incremental social benefits of the MICS.” (p. 5-6)

Response: Performing such an analysis in any detail requires the same types of facility specific data that make the two analyses discussed above impossible given available data.

Comment: “By reducing the perceived compliance risk through effective and clear regulation, the Commission reduces the risks in lending. Lower risks can translate into lower financing costs, allowing more gaming to satisfy unmet consumer demand. By meeting more of consumers’ demand for Class II gaming, the rule would provide incremental benefits ... Unfortunately, finding empirical evidence to quantify this benefit is difficult.” (p. 5-9)

Response: The costs and benefits listed above were not quantified in our analysis. They were found to be either insignificant for this study, or very difficult/impossible to quantify because of the lack of available data. All of these costs and benefits were mentioned but not estimated in Dr Meister’s analyses as well.

Comment: “The tribes argue that the inability for them to operate competitive Class II gaming machines reduces their bargaining power during the state compact renewal process. While this situation may be the case, unless the renegotiated compact fundamentally reduces the level of gaming activity (which would not be in the interest of the state from a revenue perspective), the shift of resources from the tribe to the state represents an economic transfer, not an economic cost. To the extent that this is a cost of the rule - not an underlying statutory requirement - its magnitude is difficult, if not impossible, to estimate. Factors other than the availability of Class II gaming are likely to play a large role in compact negotiations. Teasing out the value of this bargaining chip to the tribes is beyond the scope of this analysis. Nevertheless, this effect is important in the context of the mission of the NIGC to protect viable gaming as a public resource for tribes relative to other participants in the gaming industry.” (p. 4-20)

Response: Both analyses highlighted this potential costs as an issue, but did not quantify it.

Comment: “The Association of Certified Fraud Examiners prepares a bi-annual report with estimates on the costs and effects of occupational fraud ... While the results of the study do not directly address potential occupational fraud occurring in the Indian gaming industry, it provides useful data to put the potential fraud losses in perspective.” (p. 5-2)

Response: Even in the banking and financial sectors a significant portion of the losses come from petty theft associated with money handling rather than elaborate embezzlement schemes. This same statement would be true of other gaming operations. If anything, by reputation, one could assert that gaming operations are even more subject to attempts at theft and fraud. However, we assumed they were no more susceptible than any other large cash-based business. According to The Association of Certified Fraud Examiners, fraud and corruption rates in U.S. organizations range from 12.6 to 26.9 percent in average. As mentioned above, one can assert that gaming operations are also subject to fraud and corruption and therefore, the estimate provided seems to be reasonable. Alternative assumptions or evidence are welcome.