



**Americans for Financial Reform**  
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November 16, 2012

Ms. Elizabeth M. Murray  
Secretary  
Securities Exchange Commission  
100 F Street, NE  
Washington, DC 20549

Re: Proposed Rule Change to List and Trade Shares of the JPM XF Physical Copper Trust Pursuant to NYSE Arca Equities Rule 8.201; Release No. 34-67075; File No. SR-NYSEArca-2012-28.

Dear Sir or Madam:

Americans for Financial Reform has previously submitted comments on the issue referenced above.<sup>1</sup> However, since that time staff at the SEC's Division of Risk, Strategy and Financial Innovation have released an empirical analysis (the 'Staff Memorandum') purporting to illuminate the potential effects of NYSE Arca, Inc. proposed rule changes to list and trade shares of the JPM XF Physical Copper Trust and the iShares Copper Trust.<sup>2</sup> This Staff Memorandum is deeply flawed. The purpose of this letter is to demonstrate that its findings should not be relied upon in decision making by the Commission.

According to the Staff Memorandum, the models used in its analysis find that:

- There is no clear evidence of statistical causality between the historical flow of assets to physical metals Exchange Traded Funds (ETFs) and underlying commodity prices of those metals.
- There is not a strong statistical correlation between lagged copper inventory levels and copper prices.

These statements are misleading representations of the findings in the Staff Memorandum. While some of the statements regarding correlations are correct, they cannot be interpreted as proving or disproving causal relationships between copper stockpiling and prices. Furthermore, the

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<sup>1</sup> AFR is a coalition of over 250 national, state, local groups who have come together to advocate for reform of the financial industry. Members of AFR include consumer, civil rights, investor, retiree, community, labor, faith based, and business groups along with prominent independent experts. The previous AFR comment is available [here](#).

<sup>2</sup> See SEC Staff Memorandum of November 6, 2012, available at <http://www.sec.gov/comments/sr-nysearca-2012-28/nysearca201228-19.pdf>.

statements ignore evidence in the paper that correlations do exist between copper inventories and prices. Thus, the results of these regressions shed no light on the likely impact on copper prices of permitting exchange traded products to remove large amounts of physical supply from the market.

There are three major issues with the empirical analysis that prevent it from being interpreted as proving or disproving the impact of ETF impacts on prices:

- First, the results in Table 4 of the paper appear to contradict the authors' conclusions that there is no statistically significant relationship between copper inventories and copper prices. Instead, the Table 4 results show a strong positive relationship between total exchange copper inventories and copper prices.
- Second, the Staff Memorandum completely ignores the 'endogeneity' problem, or the problem of simultaneous causation, which is endemic in these models.
- Finally, the Staff Memorandum ignores key institutional factors in the copper market that require close attention, notably the differences between commodity ETFs backed by LME warrants and those backed by physical commodities operating outside the LME rules.

Any one of these issues would cast enormous doubt on the Staff Memorandum's interpretation of its research results. Combined, they are even more devastating. Furthermore, if these results were interpreted as suggested by the Staff Memorandum, they would contradict basic principles of supply and demand that are central to economic theory, price analysis, and the practices of market participants. Essentially, the Staff Memorandum contends there is no relationship between copper prices and the removal of physical copper supplies from the market. Any finding that would reverse such a basic market principle must be subject to a high bar, while the Staff Memorandum's analysis cannot satisfy even more elementary tests.

We recommend that the SEC take the following steps with respect to the Staff Memorandum:

- Acknowledge the limitations in the analysis, ask the staff to reconsider the paper, and withhold judgment on the proposed rule changes to permit the trading of physically-backed copper ETFs until a more robust analysis is completed.
- Before performing any additional analyses on this issue, the SEC staff should consult with market participants to better understand institutional details that govern the working of the copper market and the potential price effects of copper supply shortages, as well consult with econometric experts on how to address endogeneity issues. The results in Table 4, which appear to show evidence of supply hoarding increasing copper prices, especially merit further investigation.

- The detailed regression data, models (including computer code), and full results used in this paper should be released to the public. The technical issues raised by attempting to isolate causal effects in this case are extremely complex, and many additional robustness checks are necessary. While it is doubtful that the data used here can fully settle causal questions in any case, there is no reason not to release the data and procedures used. It raises no business confidentiality concerns and would have the benefit of bringing outside technical assistance to SEC staff.

The issues being addressed here are of great significance for commodity markets generally. If approved, the copper ETFs would be the first funds backed by physical supplies of a key industrial commodity (as opposed to a commodity traditionally used as a store of wealth, such as gold or silver). Should these ETFs be approved, it is likely that similar ETFs could be approved for other key economic inputs such as oil or agricultural commodities. In this context, it is vital that the SEC strengthen what appears to be a flawed analytic foundation for its decisionmaking regarding ETFs backed by physical commodities.

Below, we discuss in detail each of the three major issues in the Staff Memorandum and how they affect both of the major statistical findings -- the Granger causation findings in Tables 1 and 2 and the supply/price relationships in Tables 3 and 4.<sup>3</sup>

### **The Results In Table 4 Appear to Contradict The Staff Memorandum's Conclusions**

The introductory summary of the Staff Memorandum's results states clearly the paper's finding that there is "not a strong statistical relationship between copper inventories and copper prices." However, Table 4 of the Staff Memorandum does find a strong correlation between copper inventories and prices. Furthermore, this correlation is with the inventory type most likely to include the marginal unit of copper inventory on the world market, namely the total exchange inventory. Yet the Staff Memorandum inexplicably focuses only on results for copper that has physical warrants on the London Metals Exchange (LME). This is a subset of the total exchange inventory and likely less relevant in price determination. There is no attention to the significant result for the broader measure of total exchange inventory. As discussed below, we are skeptical of causal interpretations of any of these models. However, given that the authors of the Staff Memorandum do focus on the correlations found in these models it is difficult to understand their choice to ignore this highly significant coefficient.

Table 4 of the Staff Memorandum regresses monthly copper prices against copper inventory levels in the previous month (lagged inventory levels). Three different measures of inventory are used: the inventory of LME-warranted copper, the total exchange copper inventory (the sum of LME-warranted copper and copper held in inventory for the Shanghai and Comex exchanges),

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<sup>3</sup> This response addresses only the analytical issues raised by the Staff Memorandum; it does not address other critical issues such as whether the proposed ETF would encourage price manipulation by enabling market participants to hoard physical supplies of copper while trading in copper derivatives.

and total non-exchange inventory. First, the decision to specify the independent variables in this way makes it difficult to interpret any single coefficient. LME copper inventory makes up a significant percentage of total exchange inventory so the two variables are obviously highly correlated. This relationship creates the well-known problem of collinearity between regressors.

But leaving that issue aside, it is noteworthy that the coefficient on total exchange inventories in Table 4 is large and statistically significant, indicating that there is a positive correlation between inventory levels and prices.<sup>4</sup> Logically, if supply hoarding is increasing prices, then the key determinant of price levels will be inventory levels for the exchange (or off exchange) source of supply that supplies the marginal unit of copper to the market. It is supply changes on the margin which influence price. There are many reasons to believe that the marginal unit of copper supply would not be recorded in LME inventory, but instead in the Shanghai or Comex exchange inventory or potentially off-exchange altogether.

One reason is that, in recent years, copper supply inventories have been migrating away from LME and toward other exchanges.<sup>5</sup> LME inventories are now less than half of world inventories, and have been shrinking as other inventory sources have been growing. It thus appears that the inventory flow since 2008 has been mostly to non-LME exchanges. Second, the LME enforces lending rules specifically designed to discourage hoarding and market manipulation.<sup>6</sup> This would make it illogical to use LME-warranted copper to amass any copper inventories meant to be used to influence market prices.

The LME-warranted inventory is also less likely to be analogous to the JP Morgan and Black Rock ETF inventory, since these proposed physical copper ETFs are very explicit that they will \*not\* use LME warranted metal.<sup>7</sup> Given that the ETFs at issue in this analysis will use non-LME warranted metals, it is possible that the total exchange variable would be a better guide to the price impact of these new ETF inventories than the LME inventory variable would be. This is especially true since the marginal unit of world copper supply is apparently no longer on the LME but on another exchange. Another alternative would be to consider the off-exchange inventory, as the new ETF inventory will be off-exchange.<sup>8</sup> However, the significance of the off-exchange inventory would depend heavily on the details of the copper market currently. If the

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<sup>4</sup> Because the Staff Memorandum does not properly report the units in which these regression variables are measured in, and does not provide standardized coefficients, it is not possible to fully assess the economic (as opposed to statistical) significance of this coefficient or compare it to other coefficients. But the coefficient appears large (227 units, with a t-statistic of 2.2).

<sup>5</sup> See copper inventory charts available at [http://www.investmenttools.com/futures/metals/welcome\\_to\\_the\\_page\\_about\\_copper\\_futures.htm](http://www.investmenttools.com/futures/metals/welcome_to_the_page_about_copper_futures.htm)

<sup>6</sup> London Metals Exchange, “[Explanation of Metals Lending Guidance](#)”, October 5, 2011; London Metals Exchange, “[Market Aberrations: The Way Forward](#)”

<sup>7</sup> See “[Form S-1 Registration Statement Under Securities Act of 1933: JPM XF Physical Copper Trust](#)”, July 12, 2011 ; “[Form S-1 Registration Statement Under Securities Act of 1933: iShares Copper Trust](#)”, July 14, 2011.

<sup>8</sup> Table 4 does include a variable for the off-exchange inventory. The coefficient is large but not statistically significant. It is difficult to assess this finding given the collinearity issue and the lack of detail on how the off-exchange inventory variable is calculated.

off-exchange inventory is simply in process of delivery or production then it would not be analogous to the inventory levels held by the ETF which are inactive in the market.

Despite these factors, the Staff Memorandum inexplicably focuses only on the LME warranted inventory and not on the highly significant result for the broader measure of total exchange inventory.

### **The Staff Memorandum Ignores Endogeneity Problems**

The Staff Memorandum finds that various measures of prices and supply are uncorrelated. However, in every case they ignore the problem of endogeneity, or the simultaneous determination of quantity and price in supply-demand systems. This problem involves a causal loop between the dependent and independent variable such that the causal impact of the independent variable cannot be isolated. This may arise due to an omitted third variable, or the fact that both the independent and dependent variables are simultaneously determined in a larger equilibrium system of simultaneous equations (e.g. supply and demand). These kinds of simultaneity problems are a staple of introductory econometrics courses and are a very basic issue in statistical analysis of economic data.<sup>9</sup>

The problem affects the Staff Memorandum in both of the two analyses. First, Tables 1 and 2 test for a statistical relationship between asset flows into metals ETFs and metals prices. The specific statistical test used is ‘Granger causation,’ which involves determining if changes in one factor (asset flows) systematically precede changes in metals prices. For example, if an increase in financial assets in a physically backed ETF is correlated with a later increase in metals prices, then asset flow into the ETF can be said to ‘Granger cause’ the increase in price.

Granger causation is a form of correlation and it is inappropriate to infer from Granger correlation to true causation in cases where the variables are simultaneously determined. This point was clearly made in Granger’s original 1969 article, where he states that in the presence of such endogeneity Granger measures ‘lose their meaning’.<sup>10</sup> It is obvious that the financial asset level in a commodity ETF is simultaneously linked to metals prices. This link is first of all mechanical; when the price of the metal increases, the value of the commodity ETF increases along with it. This relationship creates a direct and simultaneous link between ETF values and commodity prices.

The linkage also works slightly less directly through investment behavior. Investors who observe or anticipate price increases in the relevant commodity may buy into commodity ETFs. Other

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<sup>9</sup> See e.g. Wooldridge, Jeffrey, “[Introductory Econometrics: A Modern Approach](#)”; Kennedy, Peter, “[A Guide to Econometrics](#)”; Stock, James and Mark Watson, “[Introduction to Econometrics](#)”.

<sup>10</sup> Granger, C.W.J., 1969, “[Investigating Causal Relations by Econometric Models and Cross-Spectral Methods](#)” *Econometrica* 37, 424–438. See, e.g., p. 435 – “it is clear that when instantaneous causality occurs, the measures of causal strength and phase lag will lose their meaning.” Granger refers to the issue of genuinely simultaneous causation as ‘instantaneous causality.’

investors who already have holdings in the ETF may sell their holdings and realize gains on the news that commodity prices have increased. The exact relationship between commodity prices and ETF asset flows that will be produced by all these factors is unclear, but what is certain is that commodity prices and asset levels in commodity ETFs are simultaneously determined in many ways that go well beyond the causal impact of ETFs on commodity supply.

Granger causation is an inappropriate statistical test in such cases of simultaneous determination. In the presence of simultaneity the statistical correlations which indicate Granger causality will not reflect real-world causal factors. As discussed above, Clive Granger himself stated this in his original research. More recent simulation research shows that when variables are simultaneously determined, the use of Granger techniques will lead to results that are either uncorrelated with or possibly even the opposite of the actual causal relations.<sup>11</sup> Given the level of endogeneity in the relationship between ETF asset flows and commodity prices, the findings in Table 1 and 2 are analytically flawed.

Tables 3 and 4 are based on direct correlations between physical commodity prices and commodity inventory levels, controlling for a few general economic variables. As discussed in the previous section, Table 4 does show a positive correlation between inventory levels and prices. But based on the lack of correlations between LME warranted inventory and prices, the Staff Memorandum concludes that there is no evidence of a causal relationship between the two.

However, simple correlations between price and quantity are well known to be subject to severe endogeneity bias when used to determine the true market relationships of supply and demand. This problem is perhaps the classic example of endogeneity bias.<sup>12</sup> The reason is that price and quantity are determined by both supply and demand, and supply and demand factors often move in opposite directions. This ‘simultaneous equations’ problem and the resulting endogeneity issues are at the center of econometrics and are generally introduced in beginning econometrics classes.<sup>13</sup> It was first described almost a century ago by agricultural economists applying the first Marshallian supply-demand models to commodity markets.<sup>14</sup>

The ways that the simultaneous influence of supply and demand factors make it difficult to determine true causal relationships can be demonstrated mathematically. But they are also fairly intuitive. The Staff Memorandum attempts to retrieve the causal impact of supply hoarding on prices through regressing price on quantity in the market generally. It is true that if all other

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<sup>11</sup> Op. cit.; Wilde, Joachim, “[Effects of Simultaneity on Testing Granger-Causality: A Cautionary Note About Statistical Problems and Economic Misinterpretations](#)”, Institute of Empirical Economic Research, University of Osnabruck, Working Paper 93, October, 2012.

<sup>12</sup> See, e.g., the second paragraph in the Wikipedia entry on ‘endogeneity,’ available at [http://en.wikipedia.org/wiki/Endogeneity\\_\(economics\)](http://en.wikipedia.org/wiki/Endogeneity_(economics)).

<sup>13</sup> See sources in footnote 6.

<sup>14</sup> Wright, Phillip G. (1915), “Moore’s Economic Cycles,” *The Quarterly Journal of Economics*. pp. 29, 631–641; Appendix B of Wright, Philip G. (1928), *The Tariff on Animal and Vegetable Oils*, New York: MacMillan; for a full retracing of the history see Stock, James and Francesco Trebbi, “[Retrospectives: Who Invented IV Regression?](#)”, *Journal of Economic Perspectives*, Volume 17, Number 3, Summer 2003, Pages 177–194

factors were equal, the removal of supply from the market through hoarding would increase prices, leading to a positive correlation between inventory and prices.<sup>15</sup> But other supply and demand factors will frequently introduce exactly the opposite relationship between inventory and price.

For example, a drop in prices due to a decline in market demand will also tend to create an inventory buildup, as producers hold inventory until the market recovers. This inventory buildup leads to a negative correlation between inventory level and prices. Likewise, if producers overestimate the future demand for copper and produce an oversupply in one period, then the resulting oversupply will also have a negative effect on prices later. Note that in this oversupply case the supply inventory variable would increase just as it would if copper is hoarded. However, the effect on prices is the opposite of what occurs when supply hoarding takes place. The key difference is that in the case of supply hoarding speculators are holding the copper off the market until the price increases, and are thus unwilling to sell at the market price. In the case of oversupply, the additional inventory is available for purchase and the inventory owners could bid down the market price to rid themselves of excessive inventory and the associated storage costs.

Thus, the overall statistical correlation between supply inventory and prices is indeterminate even if supply hoarding alone has a strong effect on prices. The inventory variable reflects a whole set of changes in supply and demand generally that go beyond the hoarding of supply for the speculative purposes. These other changes all affect inventory levels but may have very different impacts on prices.<sup>16</sup> Thus, a correlation between inventory levels and price will not isolate the effect of supply hoarding.

These kinds of endogeneity issues are notoriously difficult and technical to handle, but there are various methods used to address them. The most preferred method is to use an instrumental variables approach that isolates factors that affect market supply but are unrelated to other causal factors. Certain variable transformations could be used as well. But these methods are not deployed in the Staff Memorandum. Even more surprising, the Staff Memorandum does not discuss or address these basic issues at all, and does not use basic robustness tests or even descriptive statistics to examine their possible importance. It is impossible to give credence to the research results without addressing endogeneity issues.

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<sup>15</sup> We use the term ‘supply hoarding’ to refer to the removal of market supply by financial speculators. This has characteristics of both supply and demand. Speculators will release hoarded supply at some point as prices rise, so their supply to the market can potentially increase with price just as producers do. But as long as they expect future price increases they purchase primary supply and remove it from the market in a manner similar to consumers.

<sup>16</sup> Tables 3 and 4 do introduce some rough control variables, such as overall growth in the stock market, that are apparently intended to adjust for other factors. However, inventory is not plausibly exogenous to other factors even after introducing these controls. They are highly general, not specific to the copper market, and will not remove all other influences related to copper supply and demand.

## **The Staff Memorandum Ignores Key Institutional Factors In The Copper Market**

Price determination in any market is highly dependent on the rules used to govern that market, and this is particularly true of exchange markets. For industrial commodities, factors concerning the practical use of the commodity, such as lead times for delivery, are also important.

The Staff Memorandum analysis ignores critical institutional factors in the copper market. The most important factor is the set of rules enforced by the London Metals Exchange (LME) for holders of official LME warrants for physical copper. The LME rules on warrant holders are specifically designed to prevent market manipulation, corners, or squeezes. One key LME ‘metal lending’ rule, for example, requires that any holder of 50 percent or more of LME warrants in any metal must lend its inventory out on demand at rates designed to prevent any profit from the dominant position.<sup>17</sup>

All of the findings in the Staff Memorandum are based on analyses of ETFs backed by such LME warrants. Positions in such ETFs are also governed by LME lending rules which require ETF positions to be aggregated with other LME warrants held by the owner. Unlike the ETFs examined in the Staff Memorandum, however, the physical stocks to be held in both the JP Morgan and Blackrock proposed ETFs would not be backed by LME warrants.<sup>18</sup> Thus, any positions built up in these ETFs would not be subject to the LME rules designed to limit impacts of dominant positions on physical market prices. This disconnect between the LME warrant-based ETFs that are the subject of the Staff Memorandum’s empirical analysis and the physical copper-based ETFs that are proposed for trading in the United States means that the Staff Memorandum’s findings do not accurately reflect the likely price impacts of the proposed U.S. ETFs. All of these ETFs would operate outside of the LME rules geared to prevent market manipulation, corners, and squeezes. Indeed, it is likely that the proposed U.S. ETFs are structured specifically to avoid those LME rules. The Staff Memorandum fails to recognize or address that disconnect in its analysis.

In addition, evidence is accumulating that metals traders are finding ways to circumvent LME controls by hoarding metal that is not on LME warrants, rendering LME supply and demand figures less reliable as a guide to the market.<sup>19</sup> The implication is that the LME stock data and the LME-warranted physical funds analyzed in the Staff Memorandum are losing importance as a determinant of metals prices. Adding to this impression, there are growing doubts about the utility of not just LME inventories but any established exchange inventories in representing the true global inventory stocks of copper. Part of this doubt comes from the prospectuses for the

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<sup>17</sup> London Metals Exchange, “[Explanation of Metals Lending Guidance](#)”, October 5, 2011; London Metals Exchange, “[Market Aberrations: The Way Forward](#)”

<sup>18</sup> See “[Form S-1 Registration Statement Under Securities Act of 1933: JPM XF Physical Copper Trust](#)”, July 12, 2011 ; “[Form S-1 Registration Statement Under Securities Act of 1933: iShares Copper Trust](#)”, July 14, 2011.

<sup>19</sup> Onstad, Eric and Susan Thomas, “[Insight: The market squeeze, metals traders beat regulators](#)”, Reuters, May 4, 2012.



two physical copper ETFs being examined here, as these filings referred to global supplies that are much larger than known supplies.<sup>20</sup> If there are large global inventories that are not being fully measured then utility of any of the models in this paper is highly doubtful.

Finally, the Staff Memorandum tests lags of only one day or one month, using only a limited range of price metrics. For example, two equations test the spot month futures prices, and two equations apparently test physical delivery prices, but no equations or analysis at all of the term structure of prices (e.g., whether the market is in contango or backwardation, and if so how deep). The correct lag period to test for price impacts on copper consumers depends upon the delivery times and production lead times, which also affect the price impacts of deep backwardation on consumer access to supplies. The Staff Memorandum fails to acknowledge or take into account those critical factors.

Thank you for the opportunity to comment on this issue. Should you have any questions, please contact Marcus Stanley, AFR's Policy Director, at [marcus@ourfinancialsecurity.org](mailto:marcus@ourfinancialsecurity.org) or (202) [466-3672](tel:466-3672).

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<sup>20</sup> Kaminska, Izabella, "[More than 2.8 Million Tonnes of Hidden Copper Stocks](#)", Financial Times, September 7, 2011.