I would like to thank the referee for his very insightful and helpful comments. They are repeated below, with, where appropriate, a response by me.

(1) Different assumptions on the stickiness of nominal variables (export prices and import prices) lead to different results concerning the nominal exchange rate. This result does not come as a surprise, but it deserves attention, since it points to the implicit pricing assumptions of the "conventional wisdom".
(2) Both economists and politicians are interested in the real equilibrium. How are exports, imports, employment, output etc. affected by the BTA? This paper is silent on this question, it assumes BTA neutrality. If exports, imports etc. do not react, much of the air has gone, the change of a nominal variable is, at least from my point of view, of second order importance.

**Response**: The ambitions of this paper are limited but well-focused. It does not address, except in passing, the issue of what the richest or most plausible class of theoretical models is for which BTA neutrality would prevail. Instead it picks the key elements of a very simple model for which BTA neutrality holds. It also does not address in any detail the empirical evidence in support of or against BTA neutrality. It is focused instead on the question of what BTA neutrality, should it hold, implies for the behavior of the nominal exchange rate. This is important in its own right for two reasons. First, there has been (as documented in the paper) an avalanche of confident statements – some by distinguished economists active in the areas of trade theory and exchange rate economics – that a change by the US from an origin-based CPT to a destination-based CPT, with, say, a uniform corporate tax rate of 20%, would, if BTA neutrality prevailed, result in a 20 percent appreciation of the US dollar. This paper shows that this proposition is not robust. Second, although BTA neutrality implies that no real equilibrium values are affected by a change from an origin-based to a destination-based direct or indirect tax system, if financial market participants positioned themselves as regards long and short positions, hedging through derivatives etc. in a way that would make sense if one confidently anticipated the 20 percent appreciation held out by conventional wisdom, there could be serious disruption in financial markets should a 20 percent depreciation, shown in this paper to be not

implausible, were to occur instead. BTA neutrality might fail in that case, ex-post, for an entirely new reason: financial chaos.

(3) The paper focuses on nominal variables, but the author does say anything on the money market and monetary policy. A short discussion of this issue would be helpful.

**Response:** I have added Section 6: What monetary policy regimes support alternative pricing assumptions?

What kind of monetary policy regimes would support the four plausible alternative nominal pricing configurations studied in the earlier sections of this paper? Regardless of the nominal pricing configurations, it is clear that a monetary policy regime that pegs the nominal interest rate (either exogenously or through some feedback rule, like a Taylor Rule, that does not feed back from the *level* of nominal prices, wages or the exchange rate) will do the job. With the nominal interest rate predetermined in any given period, the nominal quantity of central bank money (the monetary base) becomes endogenously determined. Whatever the general price level generated by our nominal pricing configurations, and whatever the other arguments in the demand function for real money balances (typically some measure of real income, real output, real consumption or real wealth), the nominal money stock will adjust to satisfy the monetary equilibrium condition. This is also the way most advanced economy central banks, other than those that peg the exchange rate, implement monetary policy when they are not at the effective lower bound.

In the multi-country and multi-currency world of the paper, the simplest approach is to model domestic currency as demanded, for any of the 'intrinsic' reasons listed below, only by domestic residents (households and/or firms), and for foreign currency to be demanded for 'intrinsic' reasons only by foreign residents. Both currencies could, however, be demanded for 'intrinsic' reasons by both domestic and foreign residents without any substantive conclusion changing, as long as domestic and foreign currency are imperfect substitutes.

Clearly, the general price level that deflates the stock of nominal money balances (domestic, say) is different depending on how money is introduced into the economy. When the demand for real

money balances is derived from a money-in-the-direct-utility function approach (see e.g. Patinkin (1965)), the deflator is an index of (tax-inclusive) consumer prices. When the demand for real money balances is derived from a money-in-the-transactions-function approach (see e.g. Sims (1994, 2011)), or a cash-in-advance-cum-credit model (see e.g. Lucas and Stokey (1987)), the deflator can in principle include either tax-inclusive consumer prices and/or tax-exclusive producer prices. When one adopts a money-in-the-production-function approach (see e.g. Fischer (1974)), the deflator will be a producer price index (net of taxes)). The key point is that, with the short nominal policy rate as the (predetermined) monetary policy instrument, the monetary sector of the economy becomes the tail that is wagged by the rest of the economic system because of the passive endogeneity of the nominal stock of money. Except for any wealth effects associated with the unique nature of central bank fiat money as an irredeemable (pseudo-)liability of the State (see Buiter (2007, 2014)), the nominal and real money stocks can be eliminated from the model.[1] Any of the four plausible configurations of nominal pricing behavior can therefore be supported in an entirely straightforward manner (by pegging the nominal interest rate) with any of the standard conventions for introducing money into the economy.

(4) PTM for net-of-tax prices generates the depreciation outcome. But PTM implies a violation of the Law of One Price, which is somewhat strange as equilibrium outcome. The model circumvents this problem by assuming that Home produces two different goods, one for the domestic market and one for the Foreign market. Does the main result crucially depend on this modelling strategy?

**Response:** All the results in the paper are unaffected if we assume that the home country produces but one good which can either be consumed at home or exported. This is because in the two domestically produced goods model of the paper, a defining property of BTA neutrality is that the relative *producer* price (net of tax price) of the home good and the exported good is

[1] This is only relevant if the nominal stock of base money grows indefinitely at a rate at least equal to the risk-free nominal interest rate on non-monetary financial instruments. A permanent liquidity trap (or rather the threat of one) would be an example where such a policy might make sense (see Buiter (2014)).

constant under the BTA. This is because producers are assumed to be able to arbitrage, as sellers, across the domestic market and the export markets, but consumers cannot, as buyers, arbitrage across the domestic market and the export market. If domestic consumers were to buy the domestic export in the foreign market, they could only consume it by bringing it back home and paying the import tax/tariff. Domestic consumers can arbitrage between domestic output sold in the domestic market and imports from abroad sold in the domestic market. Under BTA neutrality, that relative price remains constant. If there were but one good produced domestically, the relative producer price (net of tax price) of the home good and the exported good is of course 1, in both the origin and the destination regime, which is a special case of a constant relative price.

I have added a section on the 'law-of-one-price'.

The net-of-tax PTM configuration does not violate the law-of-one-price in a world with country-specific and product-specific taxes and tariffs that cannot be avoided by consumers or producers.

**An aside on the law-of-one-price**

What does the 'net-of-tax-pricing-to-market' configuration, say, imply for the 'law of one price' - the proposition that a freely tradable good should, ignoring transportation costs, trade at the same price, when expressed in a common currency, in the exporting and the importing countries? The law of one price is no more that the assumption that all costless arbitrage opportunities have been exhausted. Clearly, when there are (possibly non-uniform) taxes on imports, exports and domestic goods produced for the home market, it is key to consider the law-of-one price for prices faced by producers and the law-of-one-price for prices faced by consumers. Any give consumer cannot face different purchase prices (that is, tax-inclusive prices) in markets to which he has unrestricted access. Any given producer cannot face different sale prices (that is, net-of-tax prices) in markets to which he has unrestricted access. I also assume that consumers cannot avoid paying taxes on any imports they consume (in the destination regime) and that exporters cannot avoid paying taxes on any exports they sell abroad (in the origin regime).

Therefore, in the origin regime, US consumers can face a higher tax-inclusive price for imports for the Eurozone than Eurozone consumers pay for the identical good in the Eurozone domestic

market. The price difference would be the difference between the tax on US imports and the Eurozone tax on domestic production for the Eurozone market of the identical good.

Likewise, in the destination regime, say, Eurozone consumers can face (tax-inclusive) prices for imports from the US that are different from the (tax-inclusive) prices faced by US consumers for the identical commodity produced in the US for the home market. The difference would be the difference between the US export tax and the US tax on domestic production for domestic sales. The net-of-tax- producer prices have to be the same, because the US producer can choose to sell the identical commodity at home or abroad.

The key is to consider the law-of-one price for producers and the law-of-one-price for consumers. I assume that consumers in the US cannot avoid paying taxes on any imports from the Eurozone (in the destination regime) and that exporters from the US to the Eurozone cannot avoid paying taxes on any exports (in the origin regime).

Consider the case of *net-of-tax* prices that are *constant in the currency of the importing country* (net-of-tax-pricing-to-market). The US moves from an origin-based CPT to a destination-based CPT. US dollar tax-inclusive import prices (faced by US consumers) increase by the percentage of the tax rate (by assumption). The US dollar depreciates by the same percentage as the US CPT rate. US consumers of imports pay a higher (tax-inclusive) price in US dollars but the same (tax-inclusive) price in foreign currency (the euro) as they did before. There are no arbitrage opportunities for US consumers trying to buy their imports in the Eurozone home market, as long as they cannot avoid the tax on imports. The dollar price of US goods produced for the US market increases by the same percentage as the CPT rate. So, the relative price to US consumers of imports and goods produced and purchased in the US does not change.

Eurozone exporters to the US face an after-tax euro price of their exports to the EU that is lower by the percentage of the CPT rate because of the depreciation of the US dollar (with the after-tax price in US dollars constant and the tax-inclusive price of exports to the US in dollars higher by the percentage of the CPT rate). The euro price of eurozone goods produced and sold in the Eurozone domestic market (which can be the same good as the Eurozone export good) falls by the percentage of the CPT rate – its CPT rate does not change. So, there are no arbitrage opportunities for foreign producers from switching sales from the home market to the export

market. The relative producer price (net-of-tax price) of Eurozone exports and Eurozone production for the Eurozone domestic market does not change.

US exporters get the same after-tax price in euro by assumption. Both the after-tax US dollar price and the before-tax US dollar price of US output sold in the US market (which could be the same good as US exports) increases by the same percentage as the CPT rate (there is no change in the CPT rate on US production for the domestic market). With the depreciation of the US dollar, the net-of-tax price and the tax-inclusive price in euro of US domestically produced goods sold in the US market remains constant. Again, there are no arbitrage opportunities for US producers switching sales between the domestic market and the export market. Because of net-of-tax pricing in euro, US exporters cut the before-tax price of exports to the Eurozone in euro by the percentage of the CPT rate. Because the euro price of Eurozone goods produced for the Eurozone market declines by the same percentage as CPT tax rate, Eurozone consumers have no incentive to switch demand between US exports and Eurozone goods produced for the Eurozone market.

The tax-inclusive US dollar price of exports is constant, although the tax-inclusive dollar price of US output produced for the US market rises by the percentage of the CPT rate. Consider the case where US exports are identical to US goods sold in the US market. Does the US consumer have an arbitrage opportunity by buying US exports abroad and consuming them? The US consumers could only do so (unless they emigrated to the Eurozone) by reimporting US exports without paying any import tax on them. Assuming that all imports are taxed in the destination case and that all exports are taxed in the origin case eliminates this arbitrage opportunity.

(5) Starting with Feenstra (JIE 1989) there is a discussion on the tariff pass through. The author should use this literature to motivate the pricing policy of exporters and importers.

**Response:** There is a rich theoretical and empirical literature on 'tariff pass through', which could be informative as regards the likely impact of a BTA because a tariff is a tax on trade. The classic paper of Feenstra (1989) finds that around 40 percent of the U.S. tariff increase on imports of Japanese automobiles in the 1980s was passed on as lower net-of-tariff prices to Japanese automobile exports to the U.S, so on average around 60 percent was passed on to US

consumers in tariff-inclusive prices. He obtained similar results for the pass-through of US dollar depreciation to import prices. This confirms earlier findings by Kreinin (1961), that more than two-thirds of U.S. tariff reductions in Geneva Round were passed on as higher tariff-exclusive prices to countries exporting to the US. Mallick and Marques (2008) obtained qualitatively similar results in their study of India's trade liberalization in the 1990s. The Mallick and Marques study not only studied the degree of tariff pass-through but also the degree of exchange rate pass-through. Both were found to be positive but significantly less than 1: domestic currency import prices faced by consumers fell less than proportionally with a tariff cut or an appreciation of the rupee.

Marchand (2012) studies the pass-through of tariff changes in India not just for import prices but for money wages as well. He found a significant but less than one-for-one pass-through of tariff cuts on consumer import prices and a less than one-for-one decline in money wages.

Ludema and Yu (2016) study the degree of tariff pass-through by looking at firm-level data for US exporters encountering a change in tariffs in their export markets. They confirm the monopolistic competition, (endogenous) differentiated products and productivity literature proposition that, when a large country raises its tariff rate on a product, foreign countries that sell in its market absorb part of the tariff increase by lowering their tariff-exclusive exporting prices or by increasing the quality of the products they sell. The firm-level estimate of the absolute value of tariff absorption elasticity (the percentage change in the tariff-exclusive export price in response to a one percent change in the gross tariff rate) averages -0.87 but ranges from -1.27 for low productivity firms to -0.44 for high productivity firms. These estimates imply that, for low-productivity exporting firms, a lower tariff could lead to an increase in tariff-inclusive and quality-adjusted consumer prices!

What do these tariff and exchange rate pass-through results tell us about pricing to market and net-of-tax or tax-inclusive nominal price constancy? Unfortunately, little if anything. The reason is that to answer the two-pronged question: (1) are import prices constant in terms of the currency of the importing country or the exporting country? and (2), whatever the answer to (1) is, are import prices constant net-of-tax or tax-inclusive? we need to control both for tax rates (or tariff rates) and for the exchange rate. None of the above-mentioned studies, even the ones that

consider both exchange rate pass-through and tariff pass-through, attempt to do this. Feenstra (1989), for instance, has pricing to market as the maintained hypothesis. Only given that maintained hypothesis is the degree of tariff pass-through identified.

Assume the imposition of a 10 percent US import tariff leads to a 10 percent increase in the US dollar price of US imports. That is consistent with net-of-tariff/tax pricing to market (constant net-of-tax/tariff pricing in the currency of the importing country). We can only be sure of that, however, if we know that the US dollar exchange rate did not change at the same time. The same observed behaviour of the US dollar price of imports is consistent with constant tariff/tax-inclusive pricing in the currency of the exporting country if the dollar appreciated by 10 percent. None of the studies tries to disentangle the "currency effect" from the "tariff mark-up effect".

The same problem affects the exchange rate pass-through studies. Unless one controls for tariffs (trade taxes) in the importing country and in the exporting country, the empirically observed degree of exchange rate pass-through cannot shed light on the pricing to market v. pricing to currency of origin question or on the net-of-tax/tariff v. tax-inclusive pricing issues.