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U.S. external imbalances: an empirical approach*

Desequilibrios externos de Estados Unidos: una aproximación empírica

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Abstract

This paper analyzes the behaviour of the U.S. net external position since the end of the Bretton Woods system and examines alternative paths for future adjustment. We estimate a present value expression that relates the current external imbalance with future expected portfolio return differentials and net exports growth. We find that the return differentials will be the main channel of external adjustment. Half-lives for future adjustments paths towards a balanced position are around 10 years, with these paths having been delayed due to the COVID-19 crisis. The U.S. external adjustment would also involve a significant depreciation of the dollar.

Keywords: *capital flows, external imbalances, international debt, international solvency conditions.*

JEL classification: *F31, F32, F34.*

Resumen

Este trabajo analiza el comportamiento de la posición externa neta de EE.UU. desde el final de Bretton Woods y examina diferentes sendas de ajuste futuro. Estimamos una ecuación de valor presente que relaciona los desequilibrios externos actuales con el diferencial esperado de los retornos entre activos y pasivos externos, así como el crecimiento de las exportaciones netas. Encontramos que el principal mecanismo de ajuste externo será el diferencial entre los retornos. El proceso de reducir a la mitad los desequilibrios acumulados en la actualidad duraría unos 10 años, habiendo sido el proceso de ajuste retrasado debido a la crisis de la COVID-19. El ajuste exterior de los Estados Unidos también incluiría una depreciación significativa del dólar.

Palabras clave: *flujos de capitales, desequilibrios externos, deuda externa, condiciones de solvencia internacional.*

* The views in this paper are those of the author and do not represent the views of the Bank of Spain or the Eurosystem.

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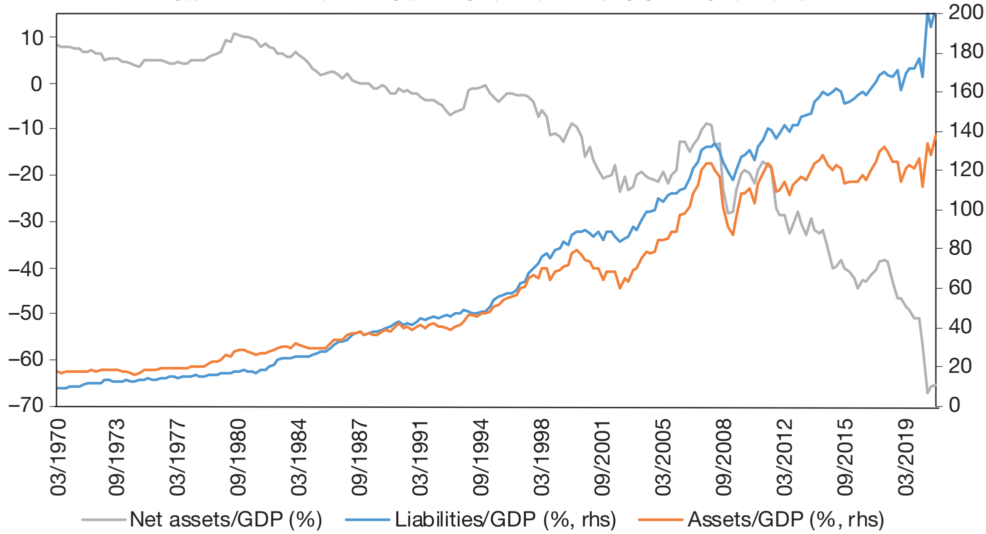
1. Introduction

After the end of the Bretton Woods system, there has been a continuous and significant deterioration of the U.S. net external position, that has been amplified due to the COVID-19 crisis. In 1973, the U.S. held a creditor net external position representing around 5 % of its Gross Domestic Product (GDP). At the end of 2019, foreign liabilities exceded foreign assets by 51 % of GDP, with that number increasing to 65 % at the end of 2020. Hence, the onset of the COVID-19 pandemic prompted a large deterioration of the U.S. net external position, when both the public and the private sector increased their leverage from international creditors in order to cope with the crisis, as Figure 1 shows. The U.S. has remained during the last decades as the country with the largest net debtor external position in absolute terms, but it is now also reaching high levels in relative terms. In this paper, we empirically examine the contribution of the different factors driving the U.S. external position over the past 48 years. We then use the results of this analysis to study how the U.S. external position will adjust in the future to meet its international financial obligations.

The process of external adjustment and the reduction of global imbalances remain crucial for two reasons. First, economies with large net liability positions are more vulnerable to capital markets disruptions, compromising their access to external financing during periods of financial stress. Second, growing imbalances may end up in sustainability problems as both public and private debt overcomes the size of the economy. These vulnerabilities played a prominent role both in the global financial crisis and during the subsequent euro area crisis, as several economies experienced

FIGURE 1

U.S. EXTERNAL POSITION AND ITS COMPONENTS



SOURCE: BEA and own elaboration.

sudden stops, sovereign debt problems, or both. Even though the U.S. does not seem to be in a position where international creditors should be worried about its capacity to repay its debts, it is clear that some form of future adjustment will be needed as no country can increase it external debtor position indefinitely. Moreover, a sudden decline in foreign demand of U.S. fixed income securities, which represent a large component of the total external liabilities, could pose a financial stability risk for the country given the current level of its external imbalance (see IMF, 2021).

Understanding the different mechanisms through which external imbalances can be corrected may help to avoid excessive unbalanced positions. In order to analyze the adjustment mechanisms we focus on empirical studies that have pointed out the importance of valuation effects in the adjustment of external imbalances, being the real exchange rate a major player. Gourinchas and Rey (2007) show that the dynamics of the exchange rate play a major role since it has the dual role of changing the differential in rates of return between assets and liabilities denominated in different currencies and also of affecting future net exports. They also point out that because the current account is reported at historical cost it may be a very approximate and potentially misleading reflection of the change of a country's net foreign asset position. Using a data set on U.S. gross external positions and portfolio returns they find that the valuation component has contributed by 27% to the cyclical external adjustment. Further analysis by Evans and Fuertes (2011), Evans (2012) and Fuertes (2019) show that the contribution of the valuation component is larger than that of the trade component when analyzing the adjustment of the whole U.S. net foreign asset position and not only its cyclical part. Also, it is important to notice that the foreign exchange plays a relevant role on the external adjustment process, affecting both the valuation component and the traditional trade component. For instante, a country such as the U.S., where most of its debt is denominated in domestic currency, would benefit from a depreciation of its currency as the relative value of its foreign assets in terms of foreign liabilities would increase. The improvement of the external position would also happen through the trade channel as the depreciation of the domestic currency would result in an increase of net exports. We will also analyze the role of the foreign exchange for the U.S. external adjustment process.

Following Evans and Fuertes (2011) and Evans (2012), we use a simple present value equation that relates current external imbalances with future expected net exports growth and portfolio return differentials.[1] Applying the methodology developed by Campbell and Shiller (1987) to this present value equation, we analyze a Vector Autoregression (VAR) specification that includes the three main variables of study (the external imbalance, net exports growth and portfolio return differentials), documenting the relative importance for the process of external adjustment of the valuation and trade components.

[1] This present value equation includes both the cyclical and the secular components of the external imbalance while the equation developed by Gourinchas and Rey (2007) only includes the cyclical component.

Within this framework, the contribution of this paper is threefold. First, we document the relative importance of the trade and the valuation components for the adjustment of the U.S net external positions over the years 1973:I – 2020:IV. During this period, the valuation component has contributed to explain 52.5 % of the variance of the U.S. net external position, being the contribution of the trade component 47.5 %. We have further investigated the time evolution of the relative importance of these two components, finding out that the valuation component has gained more relevance over the most recent decades. Second, we analyze how long it will take for the U.S. to restore a balanced external position, looking into the deterioration of the external position due to the COVID-19 crisis. In the absence of unexpected shocks, it would take nine and a half years to reduce the U.S. current external imbalance in half. Before the COVID-19 crisis, it would have taken one year less to do so. Third, we document asset pricing implications from the relationship between the exchange rate and the external adjustment process, as external imbalances predict the foreign exchange. According to this relationship, a sensible depreciation of the dollar will need to occur in the future in order for the U.S. external imbalance to be restored.

The paper proceeds as follows: Section II describes the data used and section III presents the empirical results regarding the estimation of the valuation and trade components. Section IV analyzes the future adjustment paths and section V presents the asset pricing implications. Section VI concludes.

2. Data

The empirical analysis uses quarterly data on U.S. gross foreign assets and liabilities positions as well as portfolio returns for the categories of equity, debt, Foreign Direct Investment (FDI) and other assets. It extends the data constructed by Gourinchas and Rey (2007) till 2020:IV. The data on gross positions comes from the Net International Investment Position (NIIP) from the Bureau of Economic Analysis (BEA, henceforth). They estimate quarterly positions for each category using BEA end of year positions, quarterly flows from the Federal Reserve Flow of Funds Accounts and valuation adjustments calculated using capital gains. Total returns and capital gains are obtained using the broadest stock market indices available in each country for the equity and FDI categories; and using short-term and long-term interest rates for the fixed income category. See Gourinchas and Rey (2005) for a detailed description of the series and the methodology used to compute them. Data on exports and imports comes from the National Income and Product Accounts Tables from the BEA and price index data[2] comes from the BEA as well.

[2] It is used a personal consumption expenditures price index.

The accuracy in estimating portfolio returns has been a topic of ample debate in the literature (see Fuertes, 2019). Returns are more similar among data sets obtained from market prices as we do in our sample. To the best of my knowledge the quarterly data on portfolio return used in this article is the only one using market prices that covers the period 1973:I – 2020:IV. Table 1 shows the estimates of real portfolio returns for assets and liabilities as well as the return differentials. The table includes real returns for the complete sample as well as for the periods before the Global Financial Crisis (GFC) and before the COVID-19 crisis. It was argued before the GFC that the U.S. enjoyed a privileged position as a global investor because the return differential between its foreign assets and liabilities was positive (see Gourinchas and Rey (2005)). This is documented in Table 1. Over the last years this situation has changed, with the portfolio return differential being negative at current levels. The return differential has become even more negative after the COVID-19 pandemic. This change is relevant because as we will document in the next sections the U.S. will need to enjoy positive portfolio return differentials in order to restore the external imbalance.

It is also relevant because the current account is reported at historical costs and it may be a very approximate and potentially misleading reflection of the change of a country's net foreign asset position. In the case of the U.S., this is quite obvious if we compare the cumulative value of current account deficits with the International Investment Position. Figure 2 shows these two series. Over the past decade the net external position of the U.S. was less negative than the cumulative current account due to the valuation effects related with changes in the price of assets and exchange rate movements. On the contrary, as portfolio returns differentials become negative the two series have reduced the gap, being their current levels quite similar. If portfolio return differentials continue to be negative, the cumulated current account will become much less negative than the net external position.

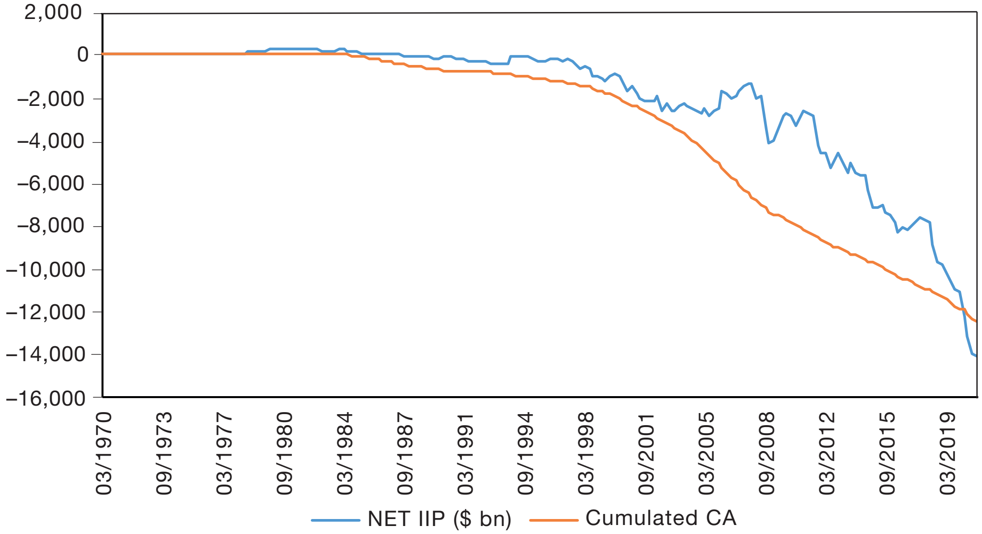
TABLE 1
RETURN DIFFERENTIALS COMPARISON
(In %)

	Claims	**Liabilities**	**Difference**
Whole Sample	0.837	0.882	–0.044
Pre-GFC	0.986	0.851	0.135
Pre-Covid	0.826	0.851	–0.025

NOTE: The data shows the average of annualized quarterly returns.
SOURCE: Own elaboration.

FIGURE 2

U.S. NET INTERNATIONAL INVESTMENT POSITION VS. CUMULATED CURRENT ACCOUNT



SOURCE: BEA and own elaboration.

3. Net external position

Gourinchas and Rey (2007) derive a present value equation that relates the cyclical component of a country's net external position with future net exports growth and portfolio return differentials. Evans and Fuertes (2011) develop a similar present value relation including both the cyclical and secular components of the country's net external position.[3] We follow this approach and use their measure of external imbalance as the variable of interest to analyze. Evans and Fuertes (2011) derive the present value relation for the net external position using several log-linearizations that include assumptions about the behaviour of different financial ratios.[4] We will next summarize the main steps to obtain this present value equation.

We start with the following equation:[5]

$$FA_t - FL_t \equiv X_t - M_t + R_t^{FA} FA_t - 1 - R_t^{FL} FL_{t-1} \tag{1}$$

Where FA_t and FL_t are gross foreign assets and liabilities at the end of period t, X_t and M_t are exports and imports during period t, all measured in terms of the consumption index. R_t^{FA} and R_t^{FL} represent gross real returns on foreign assets and

[3] A similar methodology was also applied by Evans (2012).

[4] See Evans and Fuertes (2011) and the Appendix for a complete description of the derivations.

[5] The analysis does not include the secondary income which has been historically low for the U.S.

liabilities between the end of periods $t-1$ and t. After several log-linearizations and some algebra we obtain the following relation:

$$nfa_t \approx r_t^{NFA} + \frac{1-\rho}{\rho} nx_{t-1} + \frac{1}{\rho} nfa_{t-1} \tag{2}$$

where nfa_t is the log of the ratio of foreign assets to liabilities at the beginning of period t. r_t^{NFA} is the log of the return differential of foreign assets and liabilities and nx_t is the difference between the log of exports and the log of imports. ρ is a discount factor. Defining $nxa_t = nfa_t + nx_t$ and $\Delta nx_t = nx_t - nx_{t-1}$ we obtain the following expression:

$$nxa_t \approx r_t^{NFA} + \Delta nx_t + \frac{1}{\rho} nxa_{t-1} \tag{3}$$

Iterating forward equation (3) and taking expectations conditioned on period t information, which includes de value of nxa_t, we obtain:

$$nxa_t \approx -E_t \, \Sigma_{i=1}^{\infty} \, \rho^i (r_{t+i}^{NFA} + \Delta nx_{t+i}) + E_t \lim_{i \to \infty} \rho^i (nxa_{t+i})$$

We impose the no-Ponzi game condition $E_t \lim_{t \to \infty} \rho^i (nxa_{t+i}) = 0$ on the equation above. The intuition behind this condition is that a country cannot default on its foreign claims. For the case of the U.S. it seems to be a reasonable assumption, especially if we assume that agents follow rational expectations. The next equation shows the present value relation between the variable nxa_t and future expected portfolio return differentials and net exports growth,[6]

$$nxa_t \approx -E_t \, \Sigma_{i=1}^{\infty} \, \rho^i (r_{t+i}^{NFA} + \Delta nx_{t+i}) \tag{4}$$

We will use nxa_t as the variable of interest that measures external imbalances, being the two terms at the right hand side of the equation the valuation component and the trade component respectively. This equation shows how current imbalances will be corrected in the future. Equation (4) implies that the net external position can only vary if it forecasts changes in portfolio returns or if it forecasts changes in net exports growth. If $E_t \, \Sigma_{i=1}^{\infty} \, \rho^i r_{t+i}^{NFA} = 0$, any adjustment of the net external position will come from future changes in net exports growth (trade component). On the other hand, if $E_t \, \Sigma_{i=1}^{\infty} \, \rho^i \Delta nx_{t+i} = 0$, any adjustment will come from future changes in portfolio returns (valuation component).

In order to empirically analyze the future external adjustment of the net external position, we estimate the valuation and the trade components from equation (4)

[6] In deriving equation (4) we have performed several first order approximations. To assess the accuracy of those approximations we can compute the error term from equation (3) which also includes any measurement errors from the original data. The error term is small and stationary, with its sample variance representing only 0.36 % of the sample variance of nxa_t.

following methods developed by Campbell and Shiller (1987). This estimation will show if there is any misspecification in the estimation such as non-linearities or structural breaks, as these two components should account for all the variation in the net external position.

We empirically estimate the two components on the right hand side of equation (4) following standard time series methods developed by Campbell and Shiller (1987). We also compute the percentage of the variance of nxa_t that can be explained from each of these two terms (the valuation and the trade components) and check if under the restrictions imposed by the empirical specification, equation (4) holds. We take expectations on equation (4) conditional on Ω^*, with $\Omega^* = \{nxa_{t-i}, \Delta nx_{t-i}, r^{NFA}_{t-i}\}_{i \geq 0}$. Notice that Ω^* is a subset of Ω, the period-t information. Then we obtain the following equation:

$$nxa_t \approx -\Sigma_{i=1}^{\infty} \rho^i E(r^{NFA}_{t+i} + \Delta nx_{t+i} | \Omega^*_t) \tag{5}$$

Notice that Ω^* contains all the information agents are using to calculate $E(r^{NFA}_{t+i} + \Delta nx_{t+i})$. In order to estimate the valuation and trade components we use a VAR formulation. First, we set a VAR(p) representation with $z_t = (r^{NFA}_t, \Delta nx_t, nxa_t)'$. All variables are demeaned.

$$z_t = A(L)z_{t-1} + \varepsilon_t$$

where ε_t is a vector of zero mean errors. The VAR has the following first order companion representation:

$$Z_t = \bar{A}Z_{t-1} + \bar{\varepsilon}_t$$

where $Z_t = (z'_t, ..., z'_{t-p+1})$ and $\bar{\varepsilon}_t = (\varepsilon_t, 0)$. Next, we define the vectors e_r, $e_{\Delta nx}$, e_{nxa} such that they select the different elements of Z_t (for example $e'_r Z_t = r^{NFA}_t$). We can express equation (4) in terms of the VAR formulation.

$$e'_{nxa} Z_t = -(e'_r + e'_{\Delta nx}) \Sigma_{i=1}^{\infty} \rho^i E_t Z_{t+i}$$

Notice that $E_t Z_{t+j} = \bar{A}^j Z_t$, where $\bar{A}^j$ denotes j multiplications of the $\bar{A}$ matrix. Using this last result, we obtain the following expression:

$$\begin{aligned} e'_{nxa} Z_t &= -(e'_r + e'_{\Delta nx}) \Sigma_{i=1}^{\infty} \rho^i \bar{A}^i Z_t \\ &= -(e'_r + e'_{\Delta nx}) \rho\bar{A}(1 - \rho\bar{A})^{-1} Z_t \\ &= nxa^r_t + nxa^{\Delta nx}_t \end{aligned} \tag{6}$$

The valuation and trade components are:

$$nxa_t^r = e_r'\rho\bar{A}(I-\rho\bar{A})^{-1}Z_t = -\Sigma_{i=1}^{\infty}\rho^i\bar{A}^i E(r_{t+i}^{NFA}|\Omega_t^*)$$
$$nxa_t^{\Delta nx} = e_{\Delta nx}'\rho\bar{A}(I-\rho\bar{A})^{-1}Z_t = -\Sigma_{i=1}^{\infty}\rho^i\bar{A}^i E(\Delta nx_{t+i}|\Omega_t^*)$$

When estimating the valuation and trade components we are assuming that the forecast of future changes in fundamentals, $E(r_{t+i}^{NFA} + \Delta nx_{t+i})$, can be computed from the VAR as $(e_r' + e_{\Delta nx}')\bar{A}^i Z_t$. These forecasts only represent the best forecasts of $r_{t+i}^{NFA} + \Delta nx_{t+i}$ that can be computed using linear combinations of the variables in Z_t. If the processes we are forecasting are nonlinear it may be the case that even if equation (4) holds, its empirical counterpart (5) does not. Finally, in order to find out the contribution of the valuation and trade components to the external adjustment, we perform the following variance decomposition:

$$1 = \frac{\mathrm{Cov}(nxa, nxa)}{\mathrm{Var}(nxa)} = \frac{\mathrm{Cov}(nxa^r, nxa)}{\mathrm{Var}(nxa)} + \frac{\mathrm{Cov}(nxa^{\Delta nx}, nxa)}{\mathrm{Var}(nxa)} = \beta_r + \beta_{\Delta nx} \qquad (7)$$

The regression coefficients β_r and $\beta_{\Delta nx}$ represent the share on the unconditional variance of *nxa* explained by the valuation component nxa^r and the trade component $nxa^{\Delta nx}$. We can empirically estimate *nxa*, the valuation and trade components as well as the regression coefficients β_r and $\beta_{\Delta nx}$ using the VAR estimates. Table 2 shows summary statistics of the three variables included in the VAR. As one would expect, there is little serial correlation in net export growth, Δnx_t, or the difference between the log returns of assets and liabilities, r_t^{NFA}. In contrast, the sample autocorrelations for our measure of the U.S. external position, nxa_t, decline rather slowly. We interpret these statistics to mean that nxa_t follows a covariance stationary process with a good deal of persistence. Obviously, this interpretation relies on more than just the statistical evidence: the sample autocorrelations from a non-stationary nxa_t process could look very similar to those we report in Table 2. Instead we take seriously the notion that the perceived likelihood of U.S. default was negligible over the past 45 years so that $E_t \lim_{i\to\infty}\rho^i(nxa_{t+i}) = 0$ for all t during our sample period. Clearly, agents' rational expectations could not satisfy this restriction unless the time series for nxa_t was covariance stationary. Let $\hat{A}$ denote the estimated companion matrix from the VAR. The predicted value for the nxa_t based on the VAR estimates will be:

$$\begin{aligned}\widehat{nxa}_t &= -(e_r' + e_{\Delta nx}')\rho\hat{A}(I-\rho\hat{A})^{-1}Z_t \\ &= \widehat{nxa}_t^r + \widehat{nxa}_t^{\Delta nx}\end{aligned} \qquad (8)$$

From the OLS regressions of nxa_t on $\widehat{nxa}_t^r$ and $\widehat{nxa}_t^{\Delta nx}$, we can compute the variance contribution of the estimated valuation and trade components. One way to asses the quality of the approximation in equation (4) and the validity of the assumptions behind the empirical equation (5) is to check how much of the variance of nxa_t can be explained by $\widehat{nxa}_t^r$ and $\widehat{nxa}_t^{\Delta nx}$. If the approximation is good and equation (5) holds,

TABLE 2
SUMMARY STATISTICS

Variable	Mean	Std. Dev.	Autocorrelations			
			1	4	8	12
nxa_t	–0.236	0.321	0.976	0.895	0.802	0.690
r_t^{NFA}	–0.001	0.028	0.199	–0.019	–0.116	–0.019
Δnx_t	–0.002	0.030	0.176	–0.021	–0.003	0.013

NOTE: Sample statistics for the U.S. external position; the growth in "net exports" (i.e., the ratio of exports to imports), and the return differential between the log return on U.S. foreign assets and foreign liabilities.
SOURCE: Own elaboration.

the valuation and trade components should account for all the variance of the net external position. We use the variance decomposition from equation (7) to check this out.

Table 3 shows the results of the variance decomposition of nxa_t for different periods. First, it is important to mention that the valuation and trade components are capable to explain the whole variance of nxa_t, with both components adding up almost to 100% of the variance. If this would have not been the case our estimation would not be valid. The results for the whole sample show that the valuation component has been able to explain 52.47% of the variance of the U.S. net external position. If the external adjustment process follows the historical pattern depicted since 1973, the valuation component would be the main contributor to restoring the U.S. external balance in the future. Thus, according to the historical behavior of the U.S. external position, it is expected that future positive portfolio return differentials would be the main driver for the external adjustment process. The trade component has explained 47.53% of the U.S. external imbalance. Figure 3 shows the evolution of nxa_t over time, as well as the estimated valuation and trade components. Both series show a very similar pattern, with the correlation between the two series being close to one. This is not surprising because the two of them contribute almost the same to the variance of nxa_t.

In order to analyze if there have been changes over time on the relative importance of the two components we have split up the sample in half and estimate the variance explained by each component for the two sub-samples. We acknowledge the limitations of this strategy because in order to capture the dynamics of the U.S. net external position we need to use as much historical data as possible. That is the reason why we split up the sample in half. We use the value of ρ the discount factor, that maximizes the total explained variance for each sub-sample with $\rho \in (0, 1)$. The results show that for the last decades the valuation component has largely increased its contribution to the external adjustment process. Over the period 1973:I – 1995: IV the contribution of the valuation component was 26.16%, increasing to 84.26% from 1996 till the end of the sample. Even though we keep our estimates for the

TABLE 3

UNCONDITIONAL VARIANCE DECOMPOSITION OF U.S. EXTERNAL POSITION

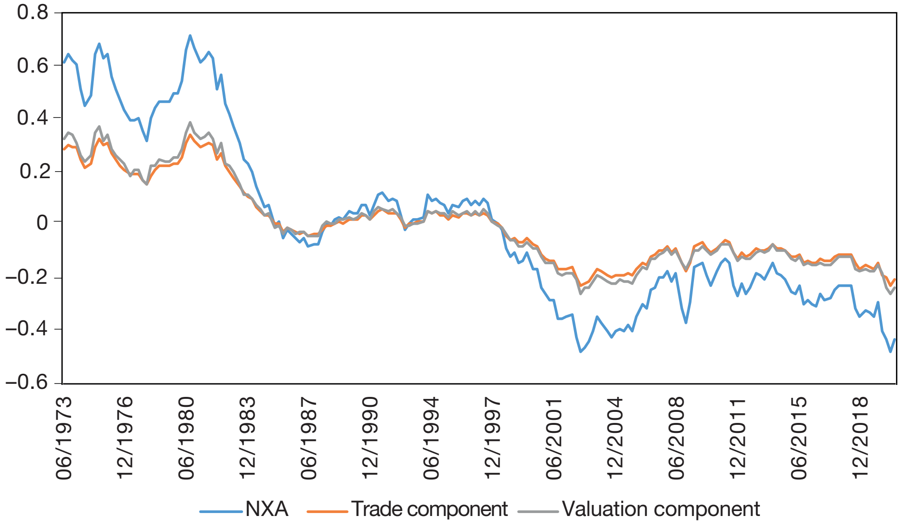
	1973:I - 2020:IV WHOLE SAMPLE	1973:I - 1995:IV SAMPLE I	1996:I - 2020:IV SAMPLE II
β_r	52.47	26.16	84.26
$\beta_{\Delta nx}$	47.53	73.82	15.66
Total	100.00	99.99	99.92

NOTE: $\beta_r(\beta_{\Delta nx})$ represents the share of the unconditional variance of *nxa* explained by the valuation (trade) component.

SOURCE: Own elaboration.

FIGURE 3

VALUATION AND TRADE COMPONENT



SOURCE: Own elaboration.

whole sample as the right ones in order to depict the behavior of the U.S. external position, the results from the sub-samples show that there may be a change about the expected adjustment path, with the valuation component gaining more prevalence over the last decades. This would mean that the portfolio return differential between assets and liabilities has increased its importance as a mechanism for the U.S. external adjustment. On the contrary, the traditional trade channel would have decreased its role on the adjustment process.

4. Future adjustment paths

We can also make an assessment of the future adjustment path of the U.S. external position by computing the future expected values of nxa_t and the valuation and trade components. These paths should be consistent with the relative relevance of the valuation and trade components. We can also learn how long will take to the U.S. to restore the external balance from its current debtor position. The anticipated future adjustment paths show an estimate of the external adjustment given the expectations about future returns and net exports growth. This exercise does not intend to forecast the future evolution of the external adjustment position but to theoretically analyse the time it would take for nxa_t to achieve a balanced position if there were no further shocks that pushed future returns and net exports away from their expected paths. We can compute the future expected adjustment path for nxa_t using the following equation:

$$E_T nxa_{T+k} = E_T \Delta^k nxa_{T+k} + nxa_T \tag{9}$$

We can also compute the future adjustment path of nxa_t if only the valuation or the trade would operate:

$$E_T nxa^v_{T+k} = E_T \Delta^k nxa^v_{T+k} + nxa_T \tag{10}$$

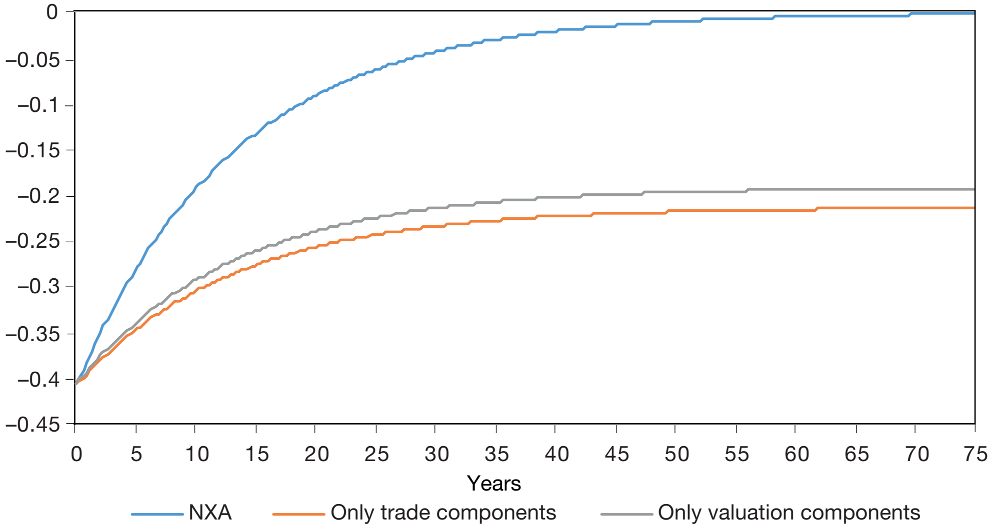
$$E_T nxa^t_{T+k} = E_T \Delta^k nxa^t_{T+k} + nxa_T \tag{11}$$

Figure 4 shows the future adjustment path, being the horizontal axes the number of quarters ahead. The blue line shows the future evolution of nxa_t while the grey and orange lines show the evolution of nxa_t if only the valuation or the trade component would operate, respectively. As we have already documented in the previous section, none of the two components would be able to restore a balanced position by itself. It would be necessary the contribution of both factors for the U.S. net external position to be on balance. It is also consistent with previous results the fact that the valuation component would be the main driver of the external adjustment process, although the trade channel would also play an important role. This is evident as the adjustment path, if only operates the valuation component (grey line), would end in a smaller debtor position than the adjustment path when only operates the trade channel. Again, it is important to notice that only through the contribution of both components the U.S. will restore its external balance.

The future expected path shows that the convergence process will be much faster over the first years, being able to reduce in half its creditor position in around nine years and a half. Half the level of the current debtor position is represented by the horizontal dotted line.

As we have already mentioned, the future expected path do not represent a forecast of the evolution of the net external position. It shows how nxa_t would evolve

FIGURE 4
FUTURE ADJUSTMENT PATHS



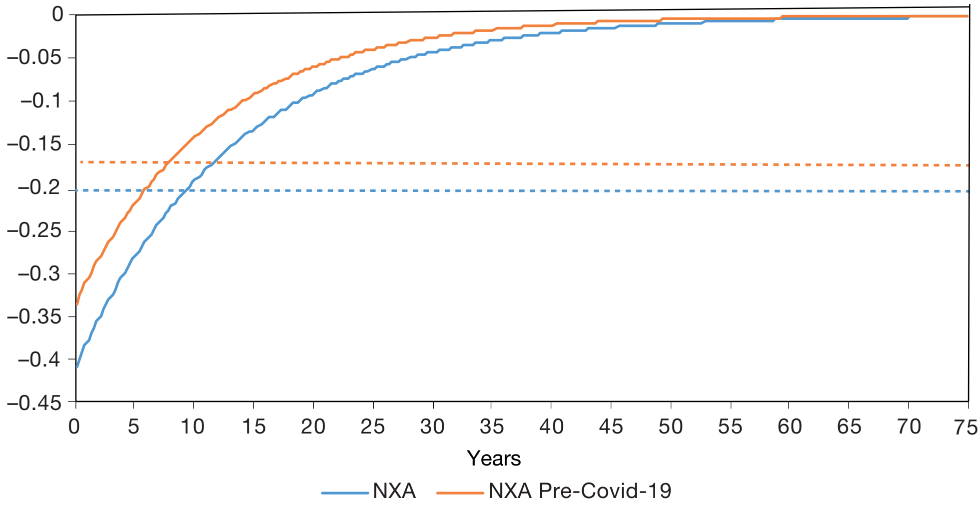
SOURCE: Own elaboration.

according to agent's expectations about the future evolution of portfolio return differentials and net exports growth in the absence of unexpected shocks.

Next, we have performed an analysis comparing the expected path of the U.S. external imbalance before and after the COVID-19 crisis. To do so we have estimated the future adjustment path for a sample ending on 2019:IV. Figure 5 shows both the future expected path for a sample ending on 2019:IV and a sample ending on 2020:IV. The horizontal dotted lines show half the level of the corresponding debtor positions at the end of each sample. Even though there may be other reasons apart from the pandemic that have driven the deterioration of the U.S. external position over the year 2020, this is a way to analyze the effects of COVID-19 on the U.S. external imbalance. The blue line shows the expected adjustment path at the end of 2020 while the red line shows the expected path at the end of 2019. The expected path at the end of 2019 did not include the effects of the pandemic, being the COVID-19 crisis an example of an unexpected shock affecting the evolution of nxa_t. At the end of 2019 the expected evolution of nxa_t showed some improvement of the external imbalance over the next four quarters, but, in reality, there was a deterioration due to the crisis.

At the end of 2019 it was expected that the U.S. net external position would be reduced in half over the next eight years and a half. After the COVID-19 crisis it will take one more year to reduce by half its debtor position. On the other hand, the contribution of the valuation and trade components has not changed that much since

FIGURE 5
FUTURE ADJUSTMENT PATHS: PRE-COVID-19 COMPARISON



SOURCE: Own elaboration.

the end of 2019. This is reasonable as we have only added four more observations to our sample (the four quarters of 2020). There has been a slightly increase in the relative importance of the valuation component thought, in line with the findings from the previous section. Over the sample 1973:I-2019:IV the valuation component was capable to explain 50.87 % of the variance of the net external position, increasing that number to 52.47 % over the whole sample (see Table 3). Over the year 2020 the expectations about the future adjustment of the U.S. external imbalance have changed such that the portfolio return differentials will play a larger role in the process.

5. Asset Pricing Implications: the dollar and the external adjustment

Given the results in previous sections, it is expected that the U.S. external imbalance has some explanatory power over the evolution of the foreign exchange. We have documented that both the valuation and trade components will play an important role in restoring to balance the U.S. net external position. Both components are affected by the foreign exchange so it is expected that nxa_t will have some forecasting power over this variable. This relationship has already been documented by Gourinchas and Rey (2007), Evans and Fuertes (2011) and Fuertes (2019). Lane and Shambaugh (2010) do also emphasize the impact of currency movements on the external positions for a large sample of countries. They find that the wealth effects associated with exchange rate changes are substantial and can explain a sizeable share of the overall valuation shocks that hit the net foreign asset position. Regarding the trade component, under the reasonable assumption that the Marshall-Lerner condition holds for most of these expected future trade flows, the expected growth in net exports should be associated with a future real depreciation of the dollar against the currencies of the U.S. main trading partners. The role of the dollar on the valuation component is more complex. Depending on the share of foreign assets and liabilities denominated in foreign currencies, the effects of foreign exchange movements on the portfolio return differentials may be different. For example, if all U.S. foreign liabilities are denominated in dollars and all U.S. foreign assets are denominated in foreign currencies, ceteris paribus, a real depreciation of the dollar would increase the return differential because it raises the return on foreign assets measured in terms of U.S. consumption. Most of the U.S. external liabilities are denominated in dollars such that we expect that this will be the case. It is also important to notice that expected return differentials could be strongly correlated with the expected future depreciation of the dollar against one foreign currency, but not another. Consequently, while the depreciation of the dollar against the currency of a major trading partner could facilitate adjustment via the trade channel, the depreciation may have little beneficial impact via the valuation channel. In order to analyze all these issues we first run the following regression:

$$\frac{1}{k}\Delta^k e_{t+k} = \alpha + \beta_1 nxa_t + \nu_{t+k} \tag{12}$$

for different horizons $k = \{1, 4, 8\}$. $\Delta^k e_{t+k}$ is the change in the real dollar exchange rate (an increase in this variable implies an appreciation of the dollar). We expect the correlation between the real dollar exchange rate and nxa_t to be postive ($\beta_1 > 0$). This will mean that any further deterioration of the U.S. net external position would imply a future depreciation of the dollar. Table 4 reports the estimates of regression (12) using the exchange rate for the dollar against a trade-weighted basket of currencies, the Deutschemark/Euro, the British Pound, and the Japanese Yen, including robust standard errors in parentheses.

The U.S. external imbalance does have predictive power over the future foreign exchange for the trade weighted and the DEM/EUR exchange rates. The sign of the coefficient is positive as expected: a deterioration on the external imbalance implies a future depreciation of the dollar. The estimates become significant over 4 and 8 quarters ahead, signaling a medium and long term relationship. Also, the R^2 increases with the horizon. Contrary to previous work done by Gourinchas and Rey (2007), Evans and Fuertes (2011), and Fuertes (2019), the regression for the British pound does not provide a significant estimate. This is due to the larger span of the sample used in this analysis. It seems that over the last years the British pound has lost its role as a channel for the U.S. external adjustment. On the contrary, the DEM/EUR has become more relevant because the estimate β_1 is larger than in previous studies (see Fuertes, 2019). The regression for the Japanese yen remains with no significant estimates as in previous studies.

TABLE 4
FORECASTING WITH THE NET EXTERNAL POSITION

Horizon	1	4	8
Trade weighted	0.0053 [0.0058]	0.0071** [0.0032]	0.0071*** [0.0025]
R^2	0.0042	0.0220	0.0378
DEM/EUR/USD	0.0137 [0.0119]	0.0170*** [0.0059]	0.0163*** [0.0044]
R^2	0.0079	0.0389	0.0646
GBP/USD	0.0028 [0.0103]	0.0060 [0.0062]	0.0062 [0.0046]
R^2	0.0004	0.0057	0.0119
JPY/USD	0.0002 [0.0098]	-0.0013 [0.0060]	–0.0044 [0.0045]
R^2	0.0000	0.0002	0.0041

NOTES: The table reports the estimated slope coeffcients, standard errors in square brackets, and R^2 statistics from regressions (12) for exchange rates computed over horizons k of 1, 4, and 8 quarters. Statistical significance at the 10, 5, and 1 percent level is indicated by *, ** and ***, respectively.

SOURCE: Own elaboration.

Next we check if the relationship found for nxa_t and the U.S. dollar is also documented for the valuation and trade components. It has to be the case that this relationship holds for at least one of the components. Otherwise, we would have not obtained statistical significant estimates from regression (12). Notice that it could also be the case that the relationship between the two components and the U.S. dollar would be different depending on the foreign exchange used. In order to analyze these issues we run the following regressions:

$$\frac{1}{k}\Delta^k e_{t+k} = \alpha^r + \beta_1^r nxa_t^r + \nu_{t+k}^r \tag{13}$$

$$\frac{1}{k}\Delta^k e_{t+k} = \alpha^{\Delta nx} + \beta_1^{\Delta nx} nxa_t^{\Delta nx} + \nu_{t+k}^{\Delta nx} \tag{14}$$

Regression (13) uses as the independent variable the valuation component. Recall the the valuation component is $nxa_t^r = -\Sigma_{i=1}^{\infty}\rho^i \overline{A}^i E(r_{t+i}^{NFA}|\Omega_t^*)$ so the regression coefficient β_1^r will be positive if the present value of future return differentials is positively correlated with a future depreciation of the dollar. Table 5 shows the results from regression (13). As it is expected the sign of β_1^r is positive and it maintains the

TABLE 5
FORECASTING WITH THE VALUATION COMPONENT OF NET EXTERNAL POSITION

Horizon	1	4	8
Trade weighted	0.0120 [0.0110]	0.0141** [0.0060]	0.0138*** [0.0048]
R^2	0.0059	0.0238	0.0393
DEM/EUR/USD	0.0301 [0.0227]	0.0336*** [0.0113]	0.0318*** [0.0083]
R^2	0.0105	0.0420	0.0677
GBP/USD	0.0078 [0.0195]	0.0123 [0.0117]	0.0125 [0.0088]
R^2	0.0008	0.0065	0.0133
JPY/USD	0.0006 [0.0187]	–0.0016 [0.0113]	–0.0082 [0.0085]
R^2	0.0000	0.0001	0.0040

NOTES: The table reports the estimated slope coeffcients, standard errors in square brackets, and R^2 statistics from regressions (13) for exchange rates computed over horizons k of 1, 4, and 8 quarters. Statistical significance at the 10, 5, and 1 percent level is indicated by *, ** and ***, respectively.
SOURCE: Own elaboration.

statistical significance found on the regression using nxa_t. The valuation component keeps a statistically significant relation over 4 and 8 quarters ahead, both with the U.S. trade weighted exchange rate and with the DEM/EUR. We also find that the R^2 increases with the horizon. The results point out that the foreign exchange will have a role on the future U.S. external adjustment through the valuation channel.

Similarly we run regression (14). In this case the trade component is $nxa_t^{\Delta nx} = -$ $- \Sigma_{i=1}^{\infty} \rho^i \bar{A}^i E(\Delta nx_{t+i} | \Omega_t^*)$ and a positive $\beta_1^{\Delta nx}$ would mean that the present value of the future net exports growth is positively correlated with a future depreciation of the dollar. Table 6 shows the results. Again, we find as it is expected that the parameter $\beta_1^{\Delta nx}$ is greater than one. The trade component also keeps an statistically significant relation over 4 and 8 quarters ahead with the U.S. trade weighted exchange rate and with the DEM/EUR. The size of the parameters β_1^r and $\beta_1^{\Delta nx}$ is similar although we find subtle differences. For instance, $\beta_1^{\Delta nx}$ is a little bit larger in the regression with the trade weighted exchange rate. This means that the trade weighted foreign exchange is more sensible to changes from the trade component than from the valuation component. On the contrary, β_1^r is larger than $\beta_1^{\Delta nx}$ when forecasting the DEM/EUR. In any case the differences are quite small and we can conclude that both the valuation and the trade component have similar effects on the exchange rate.

TABLE 6

FORECASTING WITH THE TRADE COMPONENT OF NET EXTERNAL POSITION

Horizon	1	4	8
Trade weighted	0.0114 [0.0122]	0.0149** [0.0067]	0.0149*** [0.0053]
R^2	0.0044	0.0220	0.0376
DEM/EUR/USD	0.0291 [0.0250]	0.0357*** [0.0125]	0.0342*** [0.0093]
R^2	0.0081	0.0388	0.0644
GBP/USD	0.0065 [0.0218]	0.0129 [0.0130]	0.0131 [0.0098]
R^2	0.0005	0.0058	0.0120
JPY/USD	0.0004 [0.0206]	–0.0031 [0.0126]	–0.0094 [0.0094]
R^2	0.0000	0.0003	0.0043

NOTES: The table reports the estimated slope coeffcients, standard errors in square brackets, and R^2 statistics from regressions (14) for exchange rates and return differentials computed over horizons k of 1, 4, and 8 quarters. Statistical significance at the 10, 5, and 1 percent level is indicated by *, ** and ***, respectively.

SOURCE: Own elaboration.

6. Conclusion

The U.S. net external position has experienced a constant deterioration over the last decades that has been intensified during the COVID-19 crisis. The requirements of international solvency link the external position of any country to expectations concerning future trade flows and returns on its foreign assets and liabilities. The present value model used in this paper embeds these solvency restrictions in a framework that can be easily evaluated with econometric methods. When applied to the U.S., our model provides a detailed picture of how expectations concerning future portfolio returns and trade flows have evolved as the U.S. external position deteriorated. This analysis provides estimates of how the U.S. external position will adjust in the future. These estimates suggest that the anticipated path of adjustment back towards external balance will be extremely slow and involve a prolonged and significant real depreciation of the dollar. Furthermore, the worsening of the U.S. external position during the year 2020 has delayed the adjustment path.

We also document the increase in the relative importance of future expected portfolio return differentials as a channel to restore the U.S. net external position. These expectations are against current trends observed in actual data, with portfolio return differentials becoming negative on average after the GFC. This situation implies that the U.S. will need to obtain positive portfolio return differentials in the future, in the same way it did during the years before the GFC. Further research is needed on this topic. Similarly, the future external adjustment path is expected to imply a depreciation of the dollar, which it will operate through both the valuation and the trade components. In the current context a depreciation of the dollar should not be taken for granted, specially against the euro. The U.S. economy seems to be better suited for the recovery from the pandemic than the euro area, and the monetary policy cycle is also more advanced in the U.S., implying larger interest rates. These two factors may push up the dollar against the euro. Moreover, the dollar continues to be a global safe haven currency, what it may induce a further appreciation in case of instability episodes. These arguments point out that the future adjustment path of the U.S. external position should be closely monitored, especially given the levels it is reaching compared to the GDP.

Finally, we should stress that our analysis is based on the assumption that the U.S. external position is on a sustainable path. Ultimately, there is no way to test whether this assumption is true with the available data. What we have shown is that it is possible to understand the historical deterioration in the U.S. external position in terms of changing expectations regarding future trade flows and returns, and that these expectations imply that there is an anticipated path of adjustment that will restore the U.S. to external balance. We view this finding as a starting point for more detailed analysis of how external adjustment could take place.

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