Did EMU membership cause the "Dutch disease" in the PIGS nations?

Bala Batavia [a,*], Parameswar Nandakumar [b,1]

[a] DePaul University, 1 East Jackson Boulevard, Chicago, IL 606064, USA
[b] Indian Institute of Management, Kozhikode, Kerala 673 570, India

ARTICLE INFO

ABSTRACT

This paper analyzes the effect on the relatively poorer peripheral European nations of capital inflows resulting from entry into the EMU. A two-sector model of an open economy facilitates a study of the structural effects arising out of entry into the fraternity with the richer European core. It is observed that the vastly increased capital inflows to the so-called PIGS group of nations due to EMU entry did create conditions in the labor and goods markets, which are reminiscent of those observed when the Dutch disease, or deindustrialization phenomenon develops. The impact of EMU capital on the government sector was also studied. It is noted that for a non-deterioration of the government budget balance, a traded sector that is large relative to the nontraded sector will be required, as will be a large private nontraded sector relative to the government sector. The authenticity of these derived conditions for non-deterioration of the budget balance seems to be borne out by cross-country data on the PIGS nations.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

This study seeks to explain the current developments in the poorer periphery of the European Monetary Union (EMU) by relating them to the "Dutch disease" phenomenon, also an outcome of economic integration involving trade in intermediate products like oil and gas. The thesis advanced, to be set down in mathematical model form, and to be empirically tested, is that wage and relative price developments that followed the entry of Greece, Portugal, Ireland and Spain into the EMU and led to the subsequent economic and financial crises can be explained by a Dutch disease type formulation.

---

* Corresponding author. Tel.: +1 312 362 5766.
  E-mail addresses: bbatavia@depaul.edu (B. Batavia), Nanda7285@yahoo.com (P. Nandakumar).
  [1] Tel.: +91 944 616 3450.

The *Dutch disease* term, sometimes also referred to by the term '*de-industrialization*,' was applied to the economic developments seen in Holland after discovery of natural gas and to the economic scenario observed in Great Britain after the discovery of North Sea oil. Income transfers from abroad due to sale of gas or oil led to increased domestic spending and drove up the prices of services and nontraded goods, for which the price levels are formed in the home market. The higher prices caused wage increases and made manufacturing, the competitive product prices of which cannot deviate from world market prices, non-profitable, leading to a contraction of the manufacturing sector. In the case of Great Britain, which had a flexible exchange rate system, exchange rate appreciation due to the oil revenue inflows also had the same effect - a contraction of the manufacturing sector.

The scenario described above may well represent the recent economic developments in the weaker countries of the European Monetary Union. There is considerable ongoing debate now about the lackluster performance of the Euro periphery nations, Portugal, Ireland, Greece, and Spain, sometimes termed the PIGS nations (i.e., the PIIGS nations minus Italy) and the reasons for this dismal economic performance. While it is easy to point accusing fingers at government profligacy – leading to government budget deficits – as the main culprit behind the unfortunate developments that brought at least one of the PIGS nations to the verge of bankruptcy and threats of leaving the monetary union, there is an alternative view that lays the blame for the economic debacle on external developments, more specifically those arising out of the decisions made by the PIGS nations to enter the EMU, which may fit the description of the Dutch disease phenomenon given above. According to this view, capital inflows from the rest of the EMU area have pushed up the price level, and consequently the wage levels in these countries, leading to a larger government budget outlay, which combined with stagnant tax collections (due to low tax base or a poor tax collection system), has created large government budget deficits in these peripheral EMU nations.

Thus, integration into the EMU, it is reasoned, has led to structural changes in the economies of the PIGS nations that cannot be considered beneficial or advantageous. These changes would therefore be in stark contrast to those arising due to the immensely larger market for interaction that became available due to membership in the community, with the creation of new comparative advantages in international trade. It may be also stressed that while the latter types of structural changes were brought about by the trade environment itself, those experienced by the peripheral EMU nations – discussed in this paper – were shaped by international capital flows.

As discussed above, the paper also considers possible deleterious effects of increased flow of EMU funds on government finances, prompted by the poor performance of the PIGS nations in this regard after joining the union. It is seen that the impact on the government budget balance depends on the structure of the economy (i.e., on relative sector sizes), so that, in this sense, the interplay between capital inflows and economic structure is not a purely one-sided affair.

The rest of the paper is structured as follows. Section 2 provides an insight into related literature. Section 3 presents the formal model, while Section 4 supplies the solutions of the model for the impacts of EMU membership. Section 5 is empirical, providing empirical justifications for the model. There is a final, concluding section.

2. Related literature

The debate about the fundamental causes for the economic crisis faced by the PIGS countries revolves around the relative importance of the respective roles played by faulty domestic government policies (excesses) and external factors, arising out of the entry into the EMU sisterhood. A third, less stringent voice can be heard, deriding the role played by global credit rating agencies, seen in the article by Gartner, Griesbach, and Jung (2011).

Darvas, Pisani-Ferry, and Sapir (2011) writes that the Greek public debt problem is the most severe, so much so that a primary budget surplus of 8.4% of GDP would be needed to reduce the debt-GDP ratio to 60%. However, Hellwig (2011), while also noting the fiscal excesses in Greece, which would gladden adherents of the bad internal policy-generated view of the crisis in the PIGS lands, adds that these excesses could have been due to the scenario prevailing with EMU membership, which made the PIGS lands attractive investment destinations and led to massive capital inflows. Peossa (2011)underscores the fact that the EMU peripheral countries have lost export competitiveness after entry into the union.

Giollamoir (2011) puts the main blame for the Greek crisis on the policies followed by the core EU area, especially Germany, in keeping the growth of wage costs relatively low, and creating export surpluses—at Greece's expense. According to him, what is needed is expansion in the core area, and not deflation in Greece, now that the relinquishing of a separate currency and an independent Greek central bank has removed major policy options from Greek hands.

What transpires from much of the literature cited above is that stronger nations like Germany have fared well at the expense of the peripheral nations after the latter entered the monetary union. Relative costs rose in the peripheral nations, and countries like Germany were spared competitive depreciations, which would have been undertaken had these countries retained their domestic currencies. In fact, German exports may have been more subdued with a strong Deutsche mark, than as has been the case from within the EMU. Current account surpluses in the core nations were mirrored in capital account deficits with large capital flows to the peripheral nations, where much of these flows were into non-tradable activities like construction (especially in Ireland and Spain) and not into productive, competitive sectors.

Ortega and Penalosa (2012) state that Spanish EMU membership is a crucial factor behind the country's economic crisis, explaining the build-up of external imbalances, and making adjustment possibilities more constrained. They do not refer directly to deindustrialization, but the real estate boom and the lack of adjustment in the labor market due to the institutional framework in place, recognizable ingredients in a deindustrialization scenario, are highlighted. Whelan (2013) also touches upon the construction boom – and subsequent crash – in the housing market following the access to EMU mortgage funds at historically low rates, which pushed up prices during 1996–2007 at double the U.S. rates. He notes that the rise in unemployment during the later crash also affected the government budget balance negatively due to increased welfare payments. Fotopoulos (2014) does talk specifically of deindustrialization, but then of that of the EU as a whole, due to the flight of capital to low-cost destinations like China and India, and adds that Greece, with her low competitiveness (in comparison to other EU nations), suffered relatively more in this respect.

Actually, the literature on the Dutch disease is mainly of rather old vintage. A well-known article is one by Corden and Neary (1982). Other contributions on this topic include those by Fender and Nandakumar (1987), Eastwood and Venables (1982), Forsyth and Kay (1980), Neary and Wijnbergen (1984), and Wijnbergen (1984).

Recent contributions include Alcott and Keniston (2015), who investigate the incidence of the Dutch disease due to oil and gas production booms in regional economies in the Unites States. They find the occurrence of the phenomenon only in a subset of manufacturing that is highly tradable, not in the manufacturing sector as a whole. This could lend credence to the view that the Dutch disease afflicts only highly open economies, particularly those falling in the category of "small open economies" (SOEs). Another recent contribution is Frenkel and Rapetti (2012), who portray the deindustrialization brought on in Latin American countries – particularly in the first decade of the current century – by capital inflows that appreciated the real exchange rate, and also pushed up unit labor costs sharply.

A mild note of caution is perhaps in order when the terms "Dutch disease" and "deindustrialization" are thus being used interchangeably. The latter term is also used to portray a longer-run process of decline of the manufacturing sector, describing an inverted U relation with national income. Thus, Rodrik (2015) talks about premature deindustrialization, describing the phenomenon now appearing at a much lower level of income (compared to that had been seen for the developed nations) in the developing countries. Kollmeyer and Pichler (2013) also use the term "deindustrialization" in this respect, when studying the incidence of high unemployment in industrialized nations. They look at a number of reasons for deindustrialization, such as increased relative demand for services from increasingly affluent consumers, shift to less labor-intensive methods in manufacturing, offshoring of production to less developed nations etc. However, we refer only to the traditional interpretation of the term "deindustrialization" – alias the Dutch disease – in the discussion in this paper.

Now we proceed to present a formal theoretical model that predicts Dutch disease symptoms as a result of EMU entry for the PIGS countries.

3. The formal model

In this section, we develop a macroeconomic model suitable for describing the developments in the PIGS nations after EMU entry. We consider an economy producing nontraded and traded goods, the price in the

latter sector being determined in world markets. Demand for the two goods can be expressed, using linear homogeneity assumptions as

$$D_i = D_i(y, P_T/P_N)........i = N, T \tag{1}$$

where subscripts N and T represent the nontraded and traded sectors respectively, "P" represents the price level, and "y" is aggregate real income in terms of nontraded goods. The price of the nontraded good, P_N, is formed in the home market, while P_T is the price of the traded good in international markets, not moving in response to changes in domestic demand and supply. The exchange rate is fixed, and set to one for convenience, which is acceptable since we are looking at the developments within the EMU community.

Supply or output in the two sectors is produced by labor and capital—which is fixed in the short run. Since labor demand and therefore employment are functions of the product wage, output functions can be written with a positive sign as

$$S_i = S_i(P_i/W)...... \quad ...i = N, T \tag{2}$$

where "W" is the nominal wage rate. The wage rate is assumed to be indexed to move in tandem with the consumer price index, which is a weighted index of the prices in the two sectors. So,

$$P = P_T{}^\alpha P_N{}^{(1-\alpha)} \tag{3}$$

where "P" is the aggregate price level, the consumer price index, α and $(1 - \alpha)$ being the weights or shares of the traded and nontraded good in aggregate consumption expenditure, and the rate of change in the wage rate (matching the percentage increase in the aggregate price level "P") that protects the real wage level is given as.

$$\widehat{W} = \alpha\widehat{P}_T + (1-\alpha)\widehat{P}_N \tag{4}$$

with hats (ˆ) representing rates of change.

The traded sector is the competitive manufacturing sector, where productive investment takes place, investment being a function of the interest rate "r." As regards the nontraded sector, the real estate sector figures importantly there. We know that the real estate sectors in the PIGS nations have received large amounts of foreign investments after EMU entry. Therefore, investment in the nontraded sector is specified as

$$i_N = \mu F \tag{5}$$

where "F" is the total amount of foreign capital inflows into the country.

The money supply is influenced by changes in the domestic component, net exports, and net capital inflow:

$$M = H + P_T S_T(P_T/w) - P_T D_T(y, P_T/P_N) - P_T i_T(r) + F \tag{6}$$

In Eq. (6), "H" is the domestic component, "F" is net capital inflow, and the remaining terms add up to net exports (with the value of domestic consumption and investment demand for the traded good being subtracted from the value of traded good output).

The complete macroeconomic model can now be laid down:

$$S_N(P_N/W) = D_N(y, P_T/P_N) + \mu F \tag{7}$$

$$y = S_N(P_N/W) + (P_T/P_N)S_T(P_T/W) \tag{8}$$

$$H + P_T S_T(P_T/W) - P_T D_T(y, P_T/P_N) - P_T i_T(r) + F = PL(y, r) \tag{9}$$

Eq. (7) represents equilibrium in the nontraded market, while Eq. (9) is the money market equilibrium, matching real money supply, M/P, with real money demand "L." Eq. (8) is the expression for real income, which enters Eqs. (7) and (8).

4. Model solution for the effects of EMU membership

4.1. Capital inflows and booming real estate investment

Entry into the EMU unleashes a huge amount of capital inflow into the home country. The macroeconomic effects of such an avalanche can be obtained by differentiating Eqs. (7)–(9), substituting Eq. (4) for the wage response in the labor market. The results of this exercise can be represented by the matrix system Eq. (10) below:

$$
\begin{bmatrix}
\psi & -D_N E(D_N, y) & 0 \\
\Omega & y & 0 \\
\mathrm{I\!I} & -D_T E(D_T, y) - PLE(L, y) & -\{PLE(L, r) + i_T E(iT, r)\}
\end{bmatrix}
$$
$$
* \quad
\begin{bmatrix}
\widehat{P}_N \\
\widehat{Y} \\
\widehat{r}
\end{bmatrix}
\quad = \quad
\begin{bmatrix}
\mu F \\
0 \\
-F
\end{bmatrix}
\quad * \quad \widehat{F}
\tag{10}
$$

where

$$
\psi = \alpha S_N E(S_N, P_N/W) + D_N E(D_N, P_T/W)
\tag{11}
$$

$$
\Omega = S_T + S_T E(S_T, P_T/W)(1-\alpha) - \alpha S_N E(S_N, P_N/W)
\tag{12}
$$

$$
\mathrm{I\!I} = -(1-\alpha)P_T S_T E(S_T, P_T/W) + D_T E(D_T, P_T/P_N) - LP(1-\alpha)
\tag{13}
$$

In Eq. (10), E(u,z) stands for the elasticity of the variable "u" with respect to the variable "z." The determinant of the system is

$$
DET = \psi y.\{-[PLE(L, r) + i_T E(i_T, r)]\} + D_N E(D_N, y).\Omega.\{-[PLE(L, r) + P_T i_T E(i_T, r)]\}
$$

It can be seen that DET > 0 when Ω > 0, which is the case when

$$
S_T + S_T E(S_T, P_T/W)(1-\alpha) > \alpha S_N E(S_N, P_N/W)
\tag{14}
$$

Eq. (14) is easily satisfied since S_T appears as an extra term on the LHS, and the supply elasticity, where labor productivity figures importantly, would be higher in the competitive traded goods sector. Thus, it can be assumed that Eq. (14) holds, making the determinant of the matrix system positive.[2]

The rates of changes of the price of the nontraded good and total real income are then from Eq. (10), obtained as

$$
\widehat{P}_N/ = -\mu F.\Omega.y.\{-[PLE(L, r) + P_T i_T E(i_T, r)]\}/DET > 0
\tag{15}
$$

and

$$
\widehat{Y}/\widehat{F} = -\mu F.\Omega.\{-[[PLE(L, r) + P_T i_T E(i_T, r)]]\}/DET < 0
\tag{16}
$$

The results obtained are quite stark. The flood of foreign capital inflows with European monetary integration pushes up the nontraded goods price and, hence, the aggregate price level, while causing a decline in aggregate real income. In other words, monetary integration leads to stagflation.[3]

---

[2] Now, α is the consumption basket share of the traded good, and (1- α) that of the non-traded good. If we approximate this with the share of the traded sector in total output, and set the initial levels of prices to unity, (12) becomes: $\Omega = S_T + E(S_T, P_T/W)$. $S_N S_T/Y - E(S_N, P_N/W)$. $S_N S_T/Y$, which is easily positive.

[3] We are looking at real income in terms of the price of non-traded goods here. The effect on real income in terms of a consumer price index, y_p, would be given as $\widehat{y}_p = \widehat{Y} - \widehat{P}_N - (\widehat{P}_N - \widehat{P}) = \widehat{y} + \alpha \widehat{P}_N$, 'Y' being nominal income, and is ambiguous. But when wage increases are tied to the price of the non-traded good, which is very possible in a period of steadily rising price of these goods accompanied by stability in the traded good price, $\alpha = 0$, and $\widehat{y}_p = \widehat{y} < 0$.

Also, since the wage rate rises by $(1 - \alpha)\,\widehat{P}_N$ and the price of the traded good is unchanged, the real (product) wage in the traded good sector rises, so that S_T clearly falls, from Eq. (2),

$$\widehat{S}_T/\widehat{F} = (1-\alpha).S_T E(S_T, P_T/W).\widehat{P}_N/\widehat{F} \quad < 0 \tag{17}$$

Hence, what we feared at the outset, the Dutch disease (or "deindustrialization"), has become a reality.

Let us also investigate the effects on the government budget balance of the flood of EMU capital. The government budget deficit is given by

$$D = WL_G - t(P_N S_N + P_T S_T) \tag{18}$$

"L_G" is employment in the government sector, and "t" is the tax rate. We ignore other kinds of public spending.

Differentiation of Eq. (18) yields, after substituting in Eq. (4),

$$D\widehat{D} = \left[WL_G(1-\alpha)\widehat{P}_N - tP_N S_{N]}\widehat{P}_N\right] + [P_T S_T E(S_T, P_T/W)(1-\alpha) - P_N S_N E(S_N, P_N/W).\alpha] \tag{19}$$

The sign of Eq. (19) is ambiguous. We can note that the second bracketed term would be positive when labor productivity, and hence the elasticity of supply is greater in the traded goods sector relative to the nontraded sector. However, perhaps the first bracketed term yields a more interesting condition for stability in the budget balance. It can be seen from the first term in Eq. (19) that the following condition will tend to prevent an increase in the government deficit:

$$t/(1-\alpha) > WL_G/P_N S_N \tag{20}$$

According to Eq. (20), a small size of the government sector relative to the private nontraded goods sector, and a small size of the private nontraded sector (a large α) relative to the competitive private traded goods sector will tend to stabilize the government budget and prevent the budget deficit from building up further. This result on the significance of the structure of the economy for its response to external shocks could be also relevant to other scenarios involving external shocks—such as oil price increases, as noted in Nandakumar (1988).

4.2. The real balance effect on consumption

The macroeconomic effects obtained so far stemmed from the flow of foreign capital into the nontraded (real estate) sector. It may be appropriate here to discuss the effects arising from the impact on private consumption. Unlike the traditional analysis of the Dutch disease, where private incomes are boosted by transfer of resource revenue, here we consider the real balance effects on consumption of capital inflows.

To keep the model simple, we consider the effects on the balance of payments – which feeds into the money supply – only of the massive capital inflow, which dominates the current account (as in the Mundellian model). Thus, the money market equilibrium is now written as

$$M/P = m = H + F = L(y, r) \tag{9'}$$

Also, the real balance (real money supply) variable, "m," now enters the demand functions:

$$D_i = D_i(y, PT/PN, m)\ldots\ldots i = N, T \tag{1'}$$

The channeling of capital inflows into real estate investment is also ignored here. With these changes introduced in the equation system, differentiation gives the following matrix system:

$$
\begin{bmatrix}
\Psi + (1-\alpha)D_N E(D_N, m) & -D_N E(D_N, y) & 0 \\
\Omega & y & 0 \\
-PL(1-\alpha) & -D_T E(D_T, y) - PLE(L, y) & -PLE(L, r)
\end{bmatrix}
$$

$$
* \begin{bmatrix} \widehat{P}_N \\ \widehat{y} \\ \widehat{r} \end{bmatrix} = \begin{bmatrix} D_N E(D_N, m).F \\ 0 \\ -F \end{bmatrix} * \widehat{F}
\tag{10'}
$$

The determinant of the matrix is now

$$
DET' = \psi y.[-PLE(L, r)] + D_N E(D_N, y).\Omega.[-PLE(L, r] > 0
$$

Solving,

$$
\widehat{P}_N/\widehat{F} = D_N E(D_N, m).F[-PLE(L, r)]/DET' > 0
$$

and

$$
\widehat{y}/\widehat{F} = -D_N E(D_N, m).F.\Omega/DET' < 0
$$

and then it follows that

$$
\widehat{S}_T/\widehat{F} = (1-\alpha).S_T E(S_T, P_T/W).\widehat{P}_N/\widehat{F} < 0
$$

Thus, the results discussed in Section 4.1 are reproduced. Eq. (20) for a non-deterioration of the government budget balance also continues to hold.

5. Empirical justification of the model

Let us now see if available data bears out the theoretical findings presented above in earlier sections.

It is clear that EMU membership has attracted large capital inflows into the PIGS nations. FDI inflows to Greece increased from 0.5 billion US $ in 1999 to around 6 billion in 2006, for Ireland from 11 billion in 1999 to 60 billion in 2007, for Portugal from 3 billion on accession to 14 billion in 2012, and for Spain from 14 billion to 83 billion in 2007. Table A.1 in the appendix provides data for the stocks of foreign direct investment in these countries.

The model in the previous section links the resulting deindustrialization and the negative impact on the government budget to labor market developments, to labor cost increases. Data on house prices in Table A.2 indicate the cost pressures in the real estate sectors of the PIGS nations – which have been major recipients of capital inflows from the non-PIGS EMU area – that would have contributed to overall inflation and wage increases.

It can be seen from Table 1 that labor costs have, indeed, gone up sharply for the PIGS nations after entry into the EMU, most markedly for Greece. These wage increases are substantially higher than for Germany and

Table 1
Labor cost index: percent changes[a]

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Greece	5.6	5.4	6.0	7.1	2.7	8.9	0.5	7.8	3.6	13.6
Ireland	5.3	7.8	8.5	4.0	5.5	5.0	4.4	4.4	5.1	3.09
Portugal	3.7	2.7	5.4	5.3	2.4	3.3	2.0	1.7	4.0	4.3
Spain	3.5	4.7	5.6	5.4	4.8	4.1	3.7	3.9	4.1	5.0
Euro area(16)	2.7	3.5	3.8	3.5	3.1	2.6	2.4	2.5	2.7	3.5
Germany	2.5	3.3	2.6	2.3	2.6	1.3	0.8	1.6	1.2	2.5

[a] Source: Eurostat statistics.

Table 2
Labor costs related to the MUV index for export price of manufactures: percent changes[a].

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Greece	7.8	7.3	11.0	7.7	−4.3	1.2	−2.5	5.6	−2.7	6.2
Ireland	3.1	2.8	13.5	4.6	−1.7	−2.7	1.4	2.2	−1.2	−4.8
Portugal	1.5	0.8	10.4	5.9	−4.6	−4.4	−1.0	−0.5	−2.3	−3.5
Spain	5.7	6.6	10.6	6.0	−2.2	−3.6	0.7	1.7	−2.2	−2.8

[a] Source: Eurostat and World Bank (for MUV Index).

the rest of the Euro area. Table 2 gives the development of the real wage in terms of an index, MUV, of manufactured exports from 15 developed nations and major emerging market countries, and it is clear that the real wage in manufacturing exports production would have also experienced an upward trend for the PIGS countries. The same picture emerges when the real wage in terms of a consumer price index is considered: Table A.3 in the appendix gives the development of real wages in terms of the consumer price index.

It may be argued that the higher rates of wage increases in the PIGS nations is a result of the wage convergence process occurring as a consequence of entry into the EMU. However, it is unlikely that the extent of labor migration from these nations has been so high as to warrant sharply differing wage developments—relative to the affluent EMU countries. It may be added that the migration process from these nations on the fringes of the EMU dates back to earlier eras than the aftermath of the formation of the monetary union.

Put in other words, this paper considers capital mobility, but not perfect labor mobility; capital leaves labor way behind when it comes to mobility across borders. Also, interestingly enough, capital mobility produces wage convergence effects expected with labor mobility, just as in the Factor–Price–Equalization theorem, where trade in goods substitutes (in a way) for labor mobility.

Thus, the preamble to possible deindustrialization has, in fact, materialized in the PIGS nations. However, did these countries really catch the Dutch disease? Table 3 shows that the share of manufactured exports have fallen in these countries between 2001 and 2011, while remaining stable in some other EU nations—which may give some support for such a conjecture. However, the share of manufactured exports in total exports has also seen a downward trend in some EU nations such as Germany and France, so that no firm conclusions can be drawn about the Dutch disease afflicting the PIGS nations selectively.

It also has to be pointed out that EMU membership, while exerting a negative impact on manufactured exports through the concomitant cost increases, has another documented effect: it is clear that the bilateral trade between EMU nations has grown in leaps and bounds due to the union, the effect variably estimated in a broad range from 5% (Micco, Stein, & Ordonez, 2003) to around 60% (Frankel & Rose, 2002; Persson, 2001), and even 200% (Rose, 2000). Such a positive trade effect could be due the creation of a larger market for each individual EMU member, and even due to the creation of new country-comparative advantages for the members (Batavia & Nandakumar, 1998).

Hence, what may be stated without ambiguity may be that the vastly increased capital flows to the PIGS group due to EMU entry did create conditions in the labor and goods markets, which are reminiscent of those observed when the Dutch disease, or deindustrialization phenomenon develops, but that other – countervailing – effects of accession into the union may have prevented further progress of this affliction.

Table 3
Share of manufactures in total exports.

	2001	2011
Greece	50%	38%
Ireland	86	85
Portugal	85	75
Spain	78	70
Germany	84	83
Holland	59	64

Source: World Bank Data.

These results are broadly consistent with data. We ran a quick check, relating labor cost changes and exports to current fund inflows by performing regressions, and obtained the following results:

Table 4
Regressions results.

Dependent variable	Intercept	Independent variable	R^2
LCIPC	−4385.9 (−6.021)[***]	0.2316E + 06 *CTRY (5.539)[***]	0.18
EXPY	0.5147 (22.09)[***]	−7.53*CTRY (−5.466)[***]	0.18

Data Source: Eurostat.
[***] t values, statistically significant at 0.01 level.

These are cross-country regressions for the period 2005–2009, where LCIPC is the labor cost index percentage change, CTRY the ratio of current transfers from abroad to GDP, and EXPY exports as a percentage of GDP.

The coefficients of the current transfers term are highly significant at the 1% level for both the regressions. Thus, there seems to be supporting material for the argument that increased transfers with EMU membership drove up labor costs and affected exports negatively.

Now, has EMU membership hurt public finances in the manner laid out in the theoretical sections of this paper? The argument put forward in the previous sections has been that wage increases in the aftermath of EMU entry have a mirror image in increased government deficits.

Table 5 portrays the deterioration in public finances (in the overall budget balance) after 1999. Greece seems to have shaped up worst, as even a cursory glance can confirm.

Now, can the extent, rather, the relative magnitudes, of the budget deterioration be linked to Eq. (20) derived earlier? To examine this issue, we need data on the structure of PIGS economies. Table 6 provides this data, on the relative sizes of the traded, nontraded, and the government sectors, estimated from World Bank website sources. Note that the shares will add up to more than 100% as the "T" sector share includes exports as well as imports.

Referring back to Eq. (20), a large size of the private traded sector relative to the nontraded sector, which, in turn, is relatively large in comparison with the government sector, will tend to keep the budget balance from deterioration. By these yardsticks, examining the country data in Table 6, the following ranking for (relatively better) budget performance will emerge:

1) Spain: since the private nontraded sector is larger than the public sector, and since the traded sector is quite a bit larger than the nontraded sector.

Table 5
The government budget balance, PIGS nations: percentage of GDP[a].

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ireland	0.9	−0.4	0.4	1.4	1.7	2.9	0.1	−7.4	−13.9	−30.8
Greece	−4.5	−4.8	−5.6	−7.5	−5.2	−5.7	−6.5	−9.8	−15.6	−10.7
Spain	−0.5	−0.2	−0.3	−0.1	1.3	2.4	1.9	−4.5	−11.2	−9.7
Portugal	−4.8	−3.4	−3.7	−4.0	−6.5	−4.6	−3.1	−3.6	−10.2	−9.8

[a] Source: Eurostat.

Table 6
Structure of the PIGS Economies[a].

	Share of the traded sector	Share of the nontraded sector	Share of the government sector
Greece	59%	41%	52.5%
Ireland	>92%	<8%	45%
Portugal	78%	22%	44%
Spain	63%	37%	28.8%

[a] Source: World Bank Data.

2) Ireland: since the traded sector is much larger than the nontraded sector (but, unlike the case of Spain, the nontraded sector in Ireland is smaller than the government sector).
3) Portugal
4) Greece, which only scrapes through for the first condition linking the traded and nontraded sectors and fails to achieve the second condition linking the nontraded and government sectors.

It can be observed that the data in Table 4 rhymes well with the rankings given above; Spain has indeed fared better than even Ireland, and the Greek government budget balance fared the worst after EMU entry.

6. Concluding comments

This paper has laid out a macroeconomic model that goes part of the way in capturing the developments in the peripheral nations of the EMU after accession to the union. The theoretical model predicts stagflation, de-industrialization, and deterioration in the government budget balance; the avalanche of capital inflows on EMU entry leads to price and labor market developments, which pave the way for such unsavory outcomes.

The development of the government budget balance was shown to be linked to the very structure of the economies, specifically to two conditions: for a non-deterioration of the balance, a traded sector that is large relative to the nontraded sector will be required, as is a large private nontraded sector relative to the government sector. The authenticity of these derived conditions for non-deterioration of the government budget balance is borne out by available data, with Spain, which goes furthest down the path in the fulfillment of these relationships performing best, and Greece – nowhere near the fulfillment of the conditions – faring the worst.

Appendix A

Table A.1
Direct investment stock (% of GDP).

	2001	2002	2003	2004	2005	2006	2007	08	2009	2010
Ireland	39.4	42.9	41.2	52.2	54.2	51.56	54.0	67.1	127.1	162.7
Greece	5.1	5.5	5.7	5.4	5.9	8.2	10.3	11.5	12.9	14.4
Portugal	18.8	14.5	19.0	21.6	23.1	25.5	27.2	26.3	28.2	28.9
Spain	32.0	30.6	29.6	32.4	28.5	33.6	37.5	39.0	41.4	46.4

Source: Eurostat http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tec00047

Table A.2
House prices, PIGS nations percent changes.

	2005	2006	2007	2008	2009
Greece	10.9	13.0	6.2	1.5	4.3
Ireland	8.1	14.5	8.5	− 5.9	− 18,3
Spain	14.6	10.0	5.5	0.2	− 7.6
Germany	− 2.0	0.0	1.1	0.6	0.6

Source: OECD data.

Table A.3
Real wage development, relative to CPI inflation, PIGS nations.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Greece	3.0	2.2	2.6	3.5	− 0.8	2.1	0.9	4.6	0.4	9.4
Ireland	3.7	2.2	3.6	− 0.7	2.0	2.8	2.0	0.5	0.2	− 1.1
Portugal	1.4	− 0.1	1.0	1.8	− 0.9	0.9	− 0.3	− 1.0	1.2	1.4
Spain	1.2	1.3	2.0	2.3	1.8	1.1	0.3	0.4	1.3	0.9

Source: Eurostat statistics and World Bank (for inflation).

References

Alcott, H., & Keniston, D. (2015, April). Dutch disease or agglomeration? The local economic effect of natural resource booms. *NBER Working Paper No. 20508.*

Batavia, B., & Nandakumar, P. (1998). Swedish Integration with the European Union: Effects on Growth and the Structure of Trade, in European Union at the Cross Roads: A Critical Analysis of Monetary Union and Enlargement. In C. Paraskevopoulos (Ed.), Edward Elgar Publishing, ch.11, pp. 175–183.

Corden, W. M., & Neary, J. P. (1982). Booming sector and de-industrialization in a small open economy. *The Economic Journal, 92*, 825–848.

Darvas, Z., Pisani-Ferry, J., & Sapir, A. (2011, February). A comprehensive approach to the Euro-area debt crisis. *Bruegel Policy Brief No. 2011/02.* http://web.unicorvinus.hu/matkg/working_papers/wp_2011_1_darvas_pisaniferry_sapir.pdf

Eastwood, R. K., & Venables, A. J. (1982). The macroeconomic implications of a resource discovery in an open economy. *The Economic Journal, 92*, 285–299.

Fender, J., & Nandakumar, P. (1987). Oil in an inter-temporal macroeconomic model. *Greek Economic Review, 9*, 1987.

Forsyth, P. J., & Kay, J. A. (1980). The economic implications of North Sea oil revenues. *Fiscal Studies, 1*, 1–28.

Fotopoulos, T. (2014, January 16). The real causes of the catastrophic crisis in Greece and the 'left'. *Global Research*. http://www.globalresearch.ca/the-real-causes-of-the-catastrophic-crisis-in-greece-and-the-left/5365013.

Frankel, J., & Rose, A. (2002). An Estimate of the Effects of the Common Currency on Trade and Income. *The Quarterly Journal of Economics, 117*(2).

Frenkel, R., & Rapetti, M. (2012). External fragility or deindustrialization: What is the main threat to latin american countries in the 2010s. *World Economic Review.*

Gartner, M., Griesbach, B., & Jung, F. (2011). *PIGS or lambs? The European sovereign debt crisis and the role of rating agencies.* Social Science Research Network. http://dx.doi.org/10.2139/ssrn.1816582.

Giollamoir, O. M. (2011, August). *Unhappy economies: Greek debt, PIIGS and the eurozone crisis.* The Commune.

Hellwig, M. (2011). Quo Vadis, Euro land? European monetary union between crisis and reform. In F. Allen, E. Carletti, & G. Corsetti (Eds.), *Life in the eurozone with or without sovereign default.* FIC Press, Wharton Financial Institutions Center.

Kollmeyer, C. V., & Pichler, F. (2013, March). Is de-industrialization causing high unemployment in affluent countries? Evidence from 16 OECD Countries, 1970–2003. *Social Forces, 91*(3), 785–812.

Micco, A., Stein, E., & Ordonez, G. (2003). The Currency Union Effect on Trade: Early Evidence from EMU. Working Paper # 490, Inter-American Development Bank. http://www.iadb.org/research/pub_hits.cfm?pub_id=WP-490&pub_file_name=pubWP-490.pdf.

Nandakumar, P. (1988). Oil price increases and the structure of small open economies. *Weltwritschaftliches Archiv. Review of World Economics, 124*, 1988.

Neary, N. P., & Wijnbergen, S. V. (1984). Can an oil discovery lead to a recession? A comment on Eastwood and Venables. *The Economic Journal, 96*, 390–395.

Ortega, E., & Penalosa, J. (2012). The Spanish economic crisis: Key factors and growth challenges in the Euro area. *Documentos Ocasionales No. 1201.* Banco de Espana, Eurosistema.

Peossa, A. (2011, December). The Euro area sovereign debt crisis: Some implications of its symmetric dimension. *Munich personal RePEc Archive.*

Persson, T. (2001). Currency unions and trade: How large is the treatment effect? *Economic Policy, 33*, 335–348.

Rodrik, D. (2015, January). Premature de-industrialization. *Paper No. 107.* IAS School for Social Science, Princeton Institute of Advanced Study.

Rose, A. (2000). OneMoney, One Market: Estimating the Effect of Common Currencies on Trade. *Economic Policy, 30*, 7–46.

Whelan, K. (2013, May). Ireland's economic crisis: The good, the bad and the ugly. *Paper presented at the Bank of Greece Conference on the Euro Crisis, Athens, 24.* (pp. 2013).

Wijnbergen, S. W. (1984). The Dutch disease: A disease after all? *The Economic Journal, 94*, 41–55.

Bala Batavia is a professor of Economics at DePaul University since 1983. He was the chair of the Economics department at DePaul University from 1983 to 1988, and the acting dean of the College of Commerce during 1988–1989. He was a visiting professor of Economics at various Universities, including the Indian Statistical Institute, Bangalore, India, and at the University of Paris I-Sorbonne-Pantheon. He is a coeditor of *Journal of Economic Asymmetries* and on editorial board of a few other journals. He has numerous publications, including papers in *Journal of Money*, *Credit and Banking*, *Southern Economic Journal*, and *Open Economy Review*.

Dr. P. Nandakumar is an emeritus professor of Economics, Indian Institute of Management, Kozhikode, India, where he was a professor of Economics for over 9 years. He obtained his PhD in economics at the University of Stockholm, Sweden, in 1985. He has also taught and performed research at various universities and institutes including Sodertorn University College, Lulea University of Technology, and Konjunkturinstitutet, all in Sweden. He has published numerous articles in refereed journals including articles in *Oxford Economic Papers*, *Economics Letters*, *Weltwritschaftliches Archiv*, *Open Economy Review*, and *Journal of Economic Asymmetries*.