

**The Sustainable Debts of Philip II:  
A Reconstruction of Castile's Fiscal Position, 1566-1596\***

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**Abstract:** The defaults of Philip II have attained mythical status as the origin of sovereign debt crises. We reassess the fiscal position of Habsburg Castile, deriving comprehensive estimates of revenue, debt, and expenditure from new archival data. The king's debts were sustainable. Primary surpluses were large and rising. Debt/revenue ratios were broadly unchanged across Philip's reign. Castilian finances in the sixteenth century compare favorably with those of other early modern fiscal states at the height of their imperial ambitions, including Britain. The defaults of Philip II therefore reflected short-term liquidity crises, and were not a sign of unsustainable debts.

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## I. INTRODUCTION

Spain under the Habsburgs ruled an empire on which the sun never set. Its financial troubles appear to have stretched equally far. Castile - Habsburg Spain's dominant kingdom - was the first "serial defaulter" in history (Reinhart, Rogoff, and Savastano 2003). Philip II failed to honor his debts four times, in 1557, 1560, 1575 and 1596. Historians have emphasized the hopelessness of Castile's fiscal position (Thompson 1994b, Lovett 1982).<sup>1</sup> Fernand Braudel (1966) famously argued that only the indulgence of irrational bankers allowed Castile to incur towering debts at a time when its fiscal position was deteriorating. Fighting a series of expensive wars in a bid for European hegemony, public finances were heavily strained. Spain eventually came to hold the all-time record for the number of government bankruptcies, having failed to meet its obligations 13 times between 1500 and 1900.<sup>2</sup> There is a widespread belief that ambitious military campaigns leading to heavy spending eventually overburdened the economy, causing "imperial overstretch" (Kennedy 1987).<sup>3</sup>

While Spain's numerous defaults between 1556 and 1900 are widely cited in the literature on sovereign debt crises, we know relatively little about Castile's fiscal position in the sixteenth century. Existing evidence on tax revenues, expenditure, and debt is fragmentary. Philip II – like most early modern rulers – had very limited information about his annual revenue, expenditure, or debt. The decentralized nature and rudimentary information collection of early modern states hinders attempts at reconstruction. Assessing the overall fiscal position of Habsburg Castile therefore requires the painstaking collection of data from scattered sources, and the use of careful assumptions regarding the nature of missing data.

In this paper, we reconstruct the earliest set of annual fiscal accounts for any sovereign state in history. We provide estimates of overall debt, debt servicing, revenue, and expenditure, for Philip II's Castile, for the period 1566 to 1596. Our starting point is a new data series of the Crown's short-term debts, compiled from archival documents held in the Archive of Simancas. When combined with existing data, this series serves as a linchpin with which we reconstruct year-to-year movements in Philip II's financial position. We derive yearly estimates of the budget deficit, the primary surplus, short-term borrowing, and the stock of long-term debt.

Our estimates of Philip's fiscal position can be used to evaluate debt sustainability, focusing on the evolution of debt relative to GDP. We show that Habsburg Castile passes several tests of fiscal sustainability. Our calculations suggest that Philip's debts did not exceed future discounted primary surpluses. Rising debt was met with rising revenue. Contrary to received

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<sup>1</sup> According to Thompson (1994b), Castile's fiscal position suffered from "an unbridgeable gap between unavoidable expenditure and disposable income".

<sup>2</sup> Reinhart, Rogoff and Savastano (2003)

<sup>3</sup> Spain's poor long run economic performance has been most recently documented by Alvarez Nogal and Prados de la Escosura (2007).

wisdom, Philip II's debts were sustainable throughout his reign. Castile's fiscal position only deteriorated after the defeat of the "Invincible Armada", and this deterioration was mild. Far from being undermined by reckless spending and weak fiscal institutions, Castile's finances mainly suffered from large, temporary shocks to her military position.

To put these findings in context, we compare Castile's finances with those of other early modern European powers, such as France, Holland, and Britain. Castile ran primary surpluses larger than those in 18<sup>th</sup> century Britain, which has long been regarded as a paragon of fiscal virtue.<sup>4</sup> This is all the more remarkable since Castile found itself almost continuously at war. In combination, our findings suggest that earlier assessments of Philip's finances have been too pessimistic. The overall health of Castile's fiscal position and the Crown's ability to raise taxes and non-tax revenue made continued borrowing possible.<sup>5</sup> Our finding also implies that the 'defaults' reflected temporary liquidity shortfalls, and were not a sign of insolvency.<sup>6</sup>

Our attempt to shed new light on the history of fiscal policy is related to other work on early modern European state finances. Reinhart, Rogoff and Savastano (2003) carefully reconstruct the long-run history of debt and defaults since 1500. Bonney's European State Finance Database (Bonney 1995-2007) and the associated papers (Bonney 1999) offer a comprehensive overview of existing data. White (1989) pioneered the use of macroeconomic analysis of early modern state borrowing.<sup>7</sup> Other important contributions in the same spirit include Hoffman and Norberg (1994), and Ormrod et al. (1999). Brewer (1988) examined the rise of the tax state in the UK in response to the fiscal exigencies brought on by war.<sup>8</sup> Velde (2007) has compiled detailed data on early 18<sup>th</sup> century France. In combination, these works offer insights into the 'sinews of power' of almost every nascent European national state. Castile has also attracted scholarly attention.<sup>9</sup> Ulloa (1977) provides time series on revenue sources during Philip's reign. Lapeyre (1953), Ruiz Martín (1968), Carande (1987), Artola (1982), Ulloa (1977) and Toboso Sánchez (1987), among others, supply fragmentary evidence on short and long-term debt. Thompson (1976) compiles snapshot data on expenditure for selected years.

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<sup>4</sup> See Ferguson (2002) and Brewer (1988).

<sup>5</sup> The mechanisms that underpinned the Crown's willingness to repay, and thus its access to funds, are explored in Drelichman and Voth (2008b).

<sup>6</sup> In this sense, Philip's default would have been excusable in the sense of Grossman and Van Huyck (1988).

<sup>7</sup> In particular, this is the first study to use primary surpluses to analyze the fiscal position of a pre-modern economy.

<sup>8</sup> Ferguson (2002) emphasized the links between the Hanoverian warfare state, institutional improvements, and superior economic performance. O'Brien (1997) has underlined the benefits of mercantilist policies in an age when most competitors pursued these as well.

<sup>9</sup> For the sixteenth century, the classic works are Ruiz Martín (1965, 1968), Ulloa (1977), and Artola (1982). More recently Bilbao (1990), Thompson (1994b), Gelabert (1999), Marcos Martín (2000), Tortella and Comín (2001), Yun Casalilla (2002, 2004), and Alvarez Nogal and Prados de la Escosura (2007), have contributed much to our understanding of Spanish economic and fiscal history.

## II. HISTORICAL BACKGROUND: THE WARS AND FINANCES OF PHILIP II

In this section, we briefly summarize the context and background of Castilian finances in the sixteenth century. We begin by discussing the political regime and the authority to levy taxes, before turning to silver revenues, military events, and the defaults themselves.

### *The political regime*

From 1556 to 1596, Philip II ruled the entire territory of modern-day Spain; Northern Catalonia; large parts of the Low Countries; Naples, Sicily and Milan; and the New World from Buenos Aires to Lower California (with the exception of Brazil). In 1571 he acquired the Philippines. From the 1580s, he also ruled over Portugal and its merchant empire. Spain itself consisted of several kingdoms. Castile was dominant, accounting for as much as 83% of the population (Nadal i Oller 1984). After the marriage of the Catholic kings in 1479, Castile and Aragon were ruled by the same sovereign.<sup>10</sup> Castile was given exclusive control over territory conquered in the future; the conquest of Spanish America strengthened her position.

Both Castile and Aragon had representative assemblies, the Cortes. In the sixteenth century, the Cortes of Castile were composed of representatives from 18 major cities. These had to approve direct taxes (*servicios*), sales taxes (*alcabalas*), as well as a few additional income streams. Between 1555 and 1596, taxes subject to approval by the Cortes amounted to 43% of Crown revenue.<sup>11</sup> Taxes were classified by the Cortes as either “ordinary” or “extraordinary”. Since the Crown could only sell perpetuities backed by ordinary tax revenue, the Cortes effectively set a limit on the issuance of long-term debt (Torres López and Pérez-Prendes 1963). Tax payments were often fixed in nominal terms. This created a need to renegotiate and increase them as the ‘price revolution’ of the 16<sup>th</sup> century eroded the purchasing power of existing tax revenue. The king could reasonably expect the Cortes to renew previous funding levels (Jago 1981). Requests for increased funding were a different matter: The Cortes regularly negotiated the size of the change, attached conditions to it, and could prolong debate indefinitely if the king offered insufficient concessions.<sup>12</sup>

Philip II twice faced strong opposition by the Cortes. In 1574, because of the cost of war, the king requested a tripling of the sales taxes. The Cortes stalled. Eventually, a compromise was reached in 1575, too late to prevent a default on short-term debt. Sales taxes were doubled, with an additional one-time levy. The extra revenue helped the Crown settle with its bankers (Jago 1985;

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<sup>10</sup> Since taxes, laws and constitutional rules remained largely unchanged, it would be an exaggeration to treat the union of the crowns of Aragon and Castile as a full political merger.

<sup>11</sup> The king did not need the approval of the Cortes to collect ecclesiastical revenue and to impose taxes on matters of royal prerogative, of which mining profits were by far the most important. Section III discusses the composition of revenue in detail. The prerogatives of the Cortes in matters of taxation are discussed in Ulloa (1977, pp. 83-87).

<sup>12</sup> There is a vast literature on the role of the Cortes and their interaction with the Crown. Scholarly treatments of particular relevance for economic history can be found in Carretero Zamora (1988), Jago (1981, 1985), Thompson (1976, 1993, 1994), Fortea (2009), and the proceedings of the Congreso Científico sobre la Historia de las Cortes de Castilla y León (*Las Cortes de Castilla y León en la Edad Moderna* 1989).

Ulloa 1977, pp. 178-181). The second standoff between king and Cortes came in 1590, in the aftermath of the Armada. The attempted invasion of England had cost roughly two years' worth of revenue. The king requested new excise taxes from the Cortes – the *millones*. The Cortes attached conditions limiting the king's power to impose levies on cities (Jago 1981). They also gained, for the first time, some limited control over royal expenditure (Thompson 1994a). As these two episodes illustrate, royal power in Castile was extensive, but far from absolute. The Cortes had almost no control over expenditure, but could powerfully influence fiscal revenue and the issuance of long-term debt. The relationship between the Crown and the urban elites represented in the Cortes was therefore crucial for the fiscal position of Castile.

### *Silver*

Beginning in the 1540s, Spain received large inflows of silver from the New World. While silver mines were operated by private entrepreneurs, the Crown enforced a trading monopoly through the *Casa de la Contratación* in Seville. It taxed all remittances at a flat rate of 20%. Silver revenue was volatile, but it grew quickly. It became an important source of funds for the king by the second half of the sixteenth century.<sup>13</sup> By the end of Philip's reign, one in four ducats of Crown revenue came from silver taxes. Mining income was a royal prerogative, and hence outside the control of the Cortes. The large silver windfall allowed the Crown to increase spending on its preferred projects without having to negotiate tax increases with the urban elites (Drelichman and Voth 2008). Since silver revenue was not a source of ordinary tax revenue, it could not be used to back perpetuities. The large fluctuations and upward trend of silver remittances encouraged large-scale short-term borrowing. Since most ordinary taxes were committed to the service of long-term debt, silver was the largest component of the Crown's free cash-flow. The timing of remittances was almost certainly a key factor in three of the four defaults of Philip's reign - Figure 1 shows sizable dips in remittances in the years preceding the 1560, 1575 and 1596 bankruptcies.

### *Military events*

Philip was at war for almost all of his reign, but the intensity of conflict varied over time. Shortly after his accession to the throne, the treaty of Cateau-Cambrésis in 1559 ended the Italian War and secured peace with France. The Dutch provinces had held grudges over taxation since the times of Charles V. Combined with conflict over religious issues, discontent erupted into a full-scale revolt after 1567. Philip's military governor, the Duke of Alba, attempted to stamp out unrest with an iron fist. His persecution of Protestants turned a limited revolt into a war of independence. Despite Alba's efforts to make the territories pay for the cost of the war, Flemish and Dutch revenue fell short of spending in the Low Countries. The Army of Flanders quickly became a major expenditure item in the Castilian budget (Parker 1998, p. 123).

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<sup>13</sup> The classic works quantifying American silver remittances are Hamilton (1934) and Morineau (1985). Ulloa (1977, pp. 687-714) provides extensive data on New World revenues.

At the same time, Philip and his allies fought the Ottomans in the War of the Holy League, winning a decisive victory over the Ottoman fleet at Lepanto in 1571. The combined expenses of the Dutch Revolt and the Lepanto campaign, however, exceeded available revenue. Castile had provided almost 65% of the total cost of war against the Ottomans (Parker 1979, p. 127). With the Cortes delaying the approval of new taxes, Philip stopped servicing his short-term debts in 1575.

Following the death of the Governor General, Spanish troops in the Netherlands mutinied, sacking the loyal city of Antwerp in 1576. The Flemish and Dutch provinces united against the mutineers in the Pacification of Ghent, and drove Spanish troops out of large parts of the Low Countries. After a long lull in the fighting, Spanish forces regrouped and launched a new offensive that recaptured Antwerp and other parts of the Netherlands in 1585.

Despite major gains, the Army of Flanders never succeeded in conquering the rich provinces of Holland and Zeeland. English support for the rebels was widely blamed for the failure, and in reaction Philip and his advisors planned to invade England with the ‘Invincible Armada’. By the time the fleet sailed in 1588, over 10 million ducats, or fully two years’ worth of revenue, had been spent.<sup>14</sup> When the enterprise floundered, Spain had to rebuild its naval forces, strengthen coastal fortifications, and repel new English and French attacks. The additional cost placed a heavy burden on royal finances. Despite the *millones* tax increase, the king defaulted again in 1596.

While some military endeavors were great successes, others clearly ended in spectacular disaster. Spanish territories and Spain’s allies paid to a varying extent for these military campaigns, but the Castilian treasury was by far the largest contributor (Parker 1970, 1979, 1998, 2004).

#### *The defaults*

Debt was issued in two forms, *asientos* and *juros*. *Asientos* were short-term debt contracts negotiated between the Crown and its bankers. Many *asientos* involved transfers of funds abroad. During Philip’s reign, they usually included a license to export bullion from Castile, as well as clauses protecting the bankers against variations in the metallic content of the currency. The king was often in arrears in his payment on *asientos*. *Juros* were long-term bonds issued against a particular revenue stream, such as the sales taxes of Seville.<sup>15</sup> Because they were backed by specific tax streams, *juros* were perceived as safer investments than *asientos*, and Philip II never defaulted on them.

Philip’s father, Charles V, had assiduously serviced his debts with German bankers. Philip’s reign was different. Barely a year after ascending to the throne, he defaulted on his short-term loans. He did so again in 1575 and 1596. Philip’s first rescheduling unfolded in two stages in 1557 and 1560. The settlement involved the Fugger banking family taking control of Crown land

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<sup>14</sup> Our calculations, based on Parker (1979, 2004).

<sup>15</sup> *Juros* could only be secured by ordinary tax revenue approved by the Cortes. There were very few exceptions to this rule (Toboso Sánchez 1987).

and monopolies. It was not fully negotiated until 1566, the year in which lending resumed in earnest. Many of the new funds were provided by Genoese bankers, who introduced the practice of collateralizing *asientos* with *juros*.

As fighting in the Netherlands and in the Mediterranean escalated, so did borrowing, straining royal finances. When the Cortes stalled on Philip's request for additional funding, the king once again defaulted on *asientos*. The total outstanding amount was 14.6 million ducats, or two years' worth of revenue. Five and a half million ducats had been collateralized through standard *juros*, while 4.3 million were backed by bonds guaranteed by the *Casa de Contratación* that had failed to perform as expected and were already trading at a discount.<sup>16</sup>

The crisis of 1575 is arguably one of the most studied episodes in Spanish financial history.<sup>17</sup> Two years of negotiations with the bankers produced a settlement, known as a *medio general*, which converted all short-term loans to low interest perpetuities. Appendix C details the restructuring based on the original text of the settlement. On average, the king repaid 62 percent of accumulated debt. The bankers provided a new loan of five million ducats. Fresh lending started in 1578, and continued briskly. Philip's fourth suspension of payments, in 1596, was mild by comparison to the 1575 default. The *medio general* of 1597 rescheduled 7.04 million ducats, about two thirds of yearly revenue. Two thirds of outstanding debt was converted to 5% *juros*, and the rest was repaid in full through a *juros* swap. In the 1596 default, the king repaid an average of 80 percent of outstanding debt and accrued interest.

### III. DATA

In this section, we summarize how our new data were collected, what their basic trends are, and how they can be used to derive meaningful statistics about Philip II's finances.

#### *Revenue*

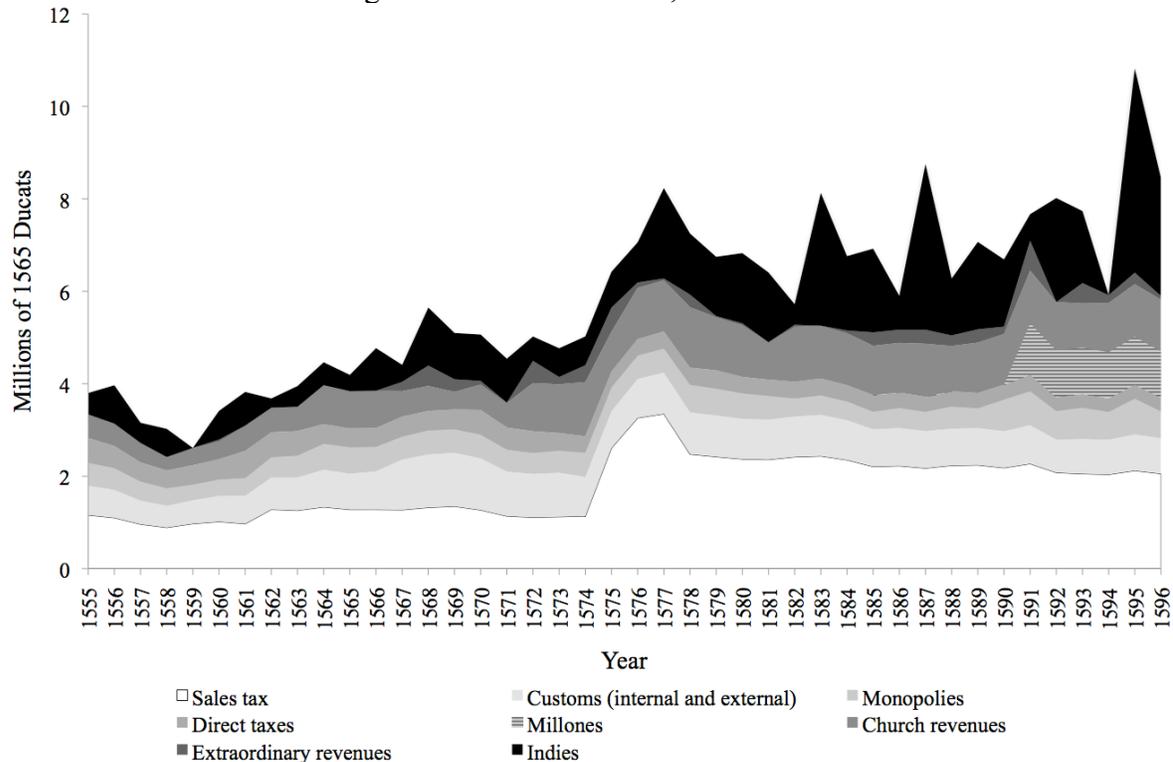
Figure 1 shows the evolution of the Crown's revenues by type between 1555 and 1596 in constant 1565 ducats. Data for individual revenue streams between 1555 and 1596 are available in Ulloa (1977) and Thompson (1976). For years with missing observations, we assume that revenues were equal to the lower of the two closest years with available data. We also use information on the frequency of tax collection.<sup>18</sup> Appendix A reports the nominal data used in Figure 1, while appendix F reports the deflator series.

<sup>16</sup> *Juros* guaranteed by the House of Trade, perhaps the most spectacular case of financial mismanagement during Philip's reign, were thoroughly studied by Ruiz Martín (1965). Since the income of the House of Trade was a royal prerogative, these *juros* were also the one notable exception to the requirement that long-term debt only be issued against Cortes-approved ordinary revenue.

<sup>17</sup> For a meticulous description of the suspension and ensuing settlement see Lovett (1980, 1982).

<sup>18</sup> This procedure and Ulloa's methodology yield a lower bound of actual revenue. Since most revenue streams did not change for long periods, the actual impact of missing data is small. Data for Indies revenue, the most volatile series, are available for every year throughout the period

Figure 1: Crown revenues, 1555-1596



Source: Ulloa (1977), Thompson (1976, p. 288), authors' calculations.

Our new series broadly agrees with existing estimates for individual years.<sup>19</sup> With the exception of silver remittances (the topmost category in the chart), revenues were largely stable because of tax farming. Tax farmers or city councils agreed to fixed yearly payments and became the residual claimants. The *alcabalas* were doubled in 1575 and the *millones* were introduced in 1591. Almost the entire volatility of the series is driven by silver revenue. The yield of the Potosí mines fluctuated from year to year. These swings were accentuated by difficulties in shipping silver across the Atlantic.

### Debt

In each bankruptcy, short-term loans were converted into long-term debt. The Crown would issue fresh *juros*, secured against new taxes voted by the Cortes (as was done in 1576). This also implies that after each general settlement (*medio general*) that ended the bankruptcies, the Crown was free of short-term obligations. We will exploit this fact to reconstruct the total debt stock.

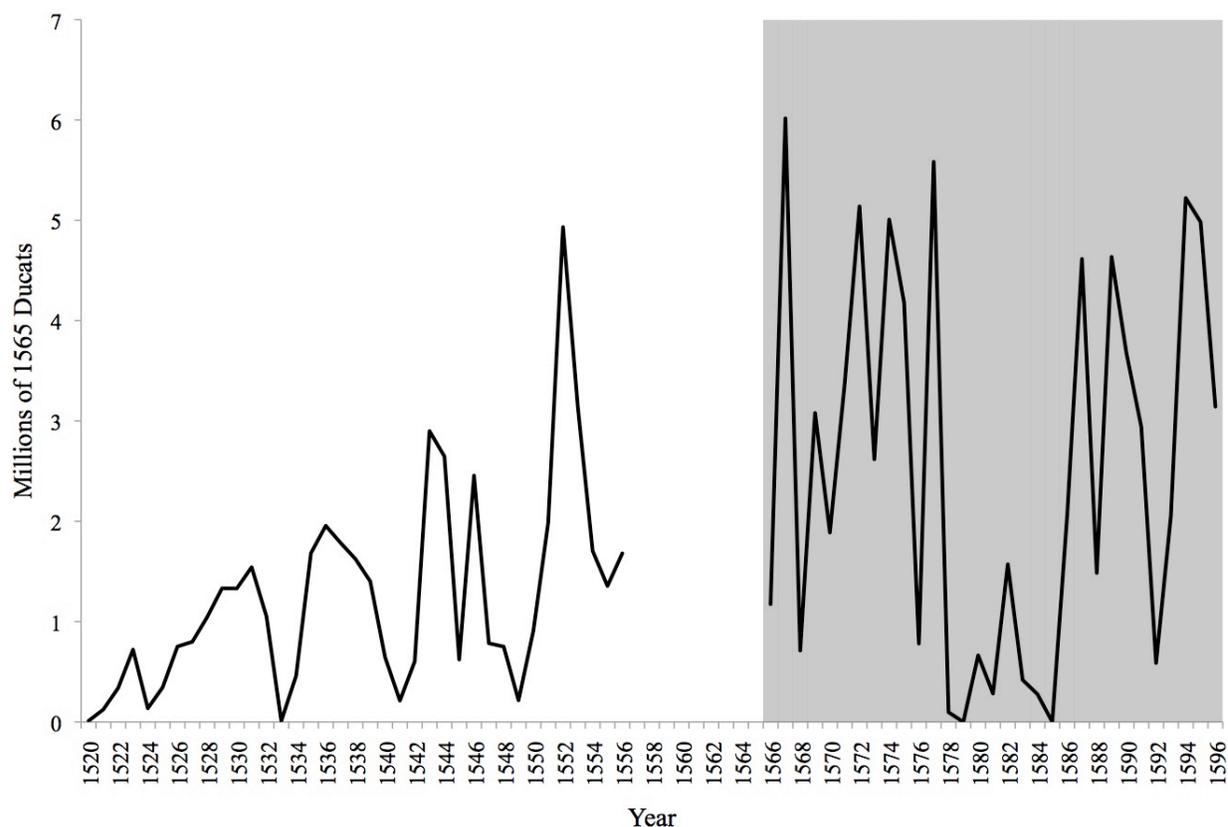
Figure 2 shows the real gross value of new *asientos* contracted between 1520 and 1596. The new data constructed from the original loan contracts in the Simancas Archive begins in 1566.<sup>20</sup> The

<sup>19</sup> For a more detailed comparison, see Appendix B.

<sup>20</sup> Archivo General de Simancas, Contadurías Generales, Legajos 84-92. This series begins in 1566, while Carande's study ends in 1556. There is a 10-year gap in the archival record which, unfortunately, encompasses the first two of Philip's bankruptcies. These episodes may have had long-running effects on the king's spending patterns, on war financing, and on his negotiations with the Cortes. It maAppendix D reports the nominal data used to construct figures 2 and 3.

earlier data were collected by Carande (1987). Previous data on Philip II's *asientos* were problematic. Ulloa's (1977) series suffered from double-counting.<sup>21</sup> In addition, *asientos* often involved more than borrowing. Both Carande's and Ulloa's estimates were based not on actual borrowing, but on the gross amounts mentioned on the front page of *asiento* documents – part of which involved transfers and exchange operations.<sup>22</sup>

Figure 2: Gross value of new *asiento* issues



Source: Artola (1982, pp. 86-87), Archivo General de Simancas, Contadurías Generales, Legajos 84-92.

In the absence of reliable data on short-term borrowing, it was impossible to reconstruct total debt and annual borrowing accurately. We compile new data on *asientos* from the original loan contracts preserved at the Archive of Simancas.<sup>23</sup> Since the work of Ulloa, the archival record of

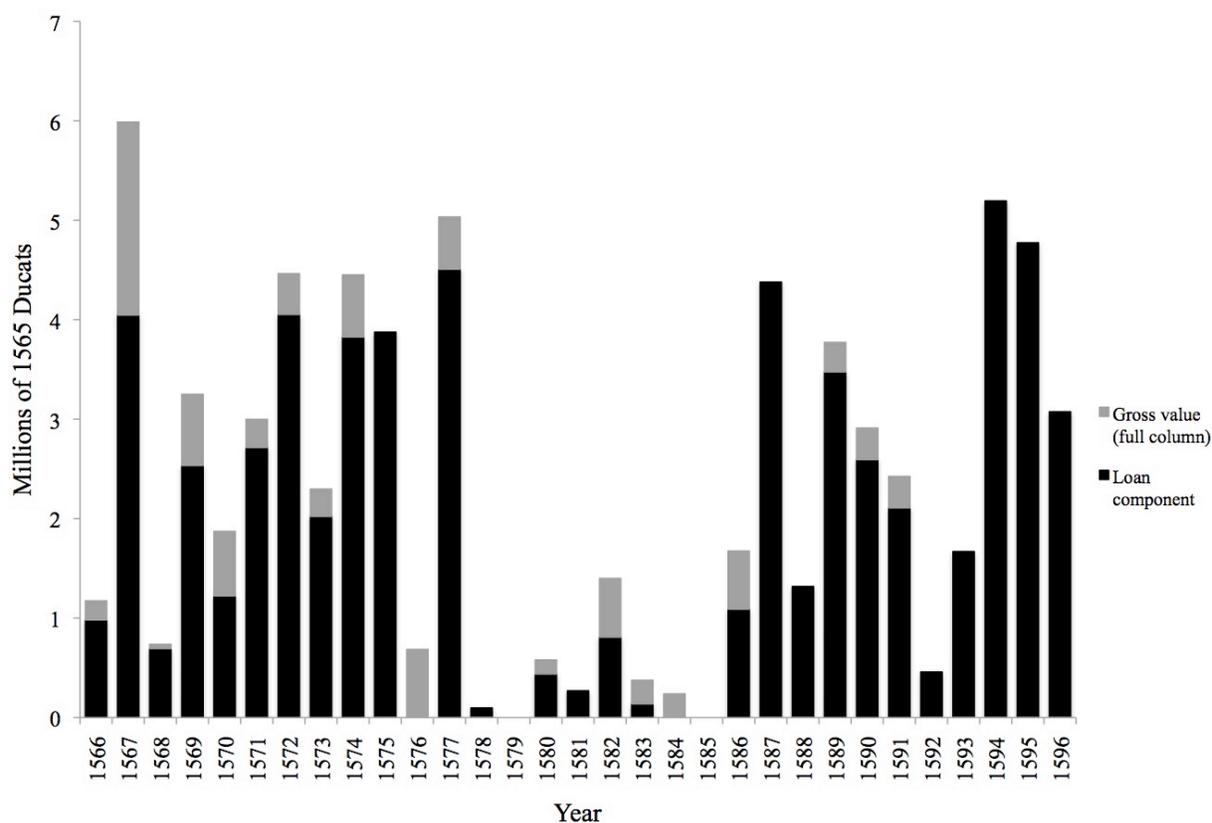
<sup>21</sup> This resulted from the fact that military commanders would take out *asientos* with financiers in the field, and send the documents to Madrid for consolidation. They would then be re-issued, and often consolidated with other debt.

<sup>22</sup> The discrepancy between the gross value and the actual loan could arise for two reasons. First, some *asientos* were pure cross-border transfers, for which the king provided the cash up-front. The bankers delivered the agreed amount at a different location, usually within a month. These contracts show a positive gross value, but obviously no loan to the Crown took place. The second source of discrepancy was that the king sometimes advanced working capital for a banking company to assemble a large loan. This advance was returned to the king early in the life of the loan. While obviously not part of the borrowed funds, the return of these advances were normally included in the gross value of the loan by the royal accountants.

<sup>23</sup> Archivo General de Simancas, Contadurías Generales, Legajos 84-92.

the *asientos* has been extensively reorganized. Our new series is free of double-counting, and we distinguish between actual borrowing and other uses of funds. This required analyzing every clause in each contract. We conducted the first such systematic analysis for all 416 *asientos* underwritten between 1566 and 1596. Figure 3 shows both gross values and loan components. Actual loans averaged 80% of gross values mentioned on the first page of *asientos*. Their earlier use exaggerated short-term borrowing, especially before 1586.

Figure 3: Loan component of new *asiento* issues



Source: Archivo General de Simancas, Contadurías Generales, Legajos 84-92.

To examine sustainability, and to reconstruct a full set of fiscal accounts, we need the cost of servicing debts. *Asientos* were convenient as a short-term borrowing device; they allowed the Crown to obtain money quickly and transfer it to virtually any point in its European dominions. They were also expensive. Their median gross rate of return was 14 percent, and many contracts cost more than 20 percent. This included compensation for currency conversions, overseas deliveries, transportation costs, and the risk of late payment and subsequent renegotiation. Many *asientos* used convoluted contractual forms. Much of the return resulted from exchange transactions at favorable rates, advance payments by the Crown without interest, and swaps of financial instruments.<sup>24</sup> Further complicating matters, scheduled repayments seldom specified

<sup>24</sup> For example, in an *asiento* underwritten by Niccoló and Vincenzo Cattaneo on December 5 1567 for a disbursement of 75,000 ducats, the king agreed to repayments in cash and *juros*, as well as swaps of low-yield *juros* for high-yield ones. In another *asiento* underwritten by Juan Curiel de la Torre on December 15 1567 for a total of 200,000 *ecús* to

whether they constituted interest or capital installments. Debt service is therefore not observable directly. We use an indirect estimation methodology instead.

First, we transcribed every clause in each of the 416 *asientos* contracted between 1566 and 1596. We thus derived the monthly cash flow agreed in the contracts. From the overall set of cash flows in each contract, we calculated a modified internal rate of return for the *asiento*.<sup>25</sup> We then estimated the total interest for each contract by multiplying its loan component by the rate of return. We also spread the total service of each *asiento* – interest and principal payments – uniformly over the life of the contract. This is in line with what the few *asientos* separating interest and principal repayment specify.<sup>26</sup> Annual debt service of the Crown is then the sum of these payments for all *asiento* contracts in force in any one year. Since the default of September 1575 stopped payments on all *asientos*, we use a value of zero for 1576 and 1577.<sup>27</sup> The settlement of 1577 converted all outstanding *asientos* into *juros*; short-term lending restarted from scratch in early 1578. We report the entire series of *asientos*, their loan components, and the estimated debt servicing in Appendix D.

*Juros* were normally perpetuities, although lifetime bonds were not uncommon. They were a favorite form of investment for the Castilian nobility and bourgeoisie. Provided that a Royal license could be obtained, *juros* could be traded in a secondary market. The Crown normally charged a fee for the right to do so. The value of a *juro* reflected the liquidity and reliability of a particular revenue stream. Interest rates on *juros* were typically 7 percent.<sup>28</sup>

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be delivered in Anvers, the king agreed to convert the Flemish currency into Spanish ducats at a substantial premium over market exchange rates. He also granted lifetime pensions to the bankers. Lifetime pensions were conventionally valued as 33-year annuities (Archivo General de Simancas, Contadurías Generales, Legajo 84).

<sup>25</sup> The modified internal rate of return (MIRR) is a measure of profitability based on the same principle as the internal rate of return (IRR) but avoiding the usual pitfalls of the latter. The MIRR requires specifying the opportunity cost of funds and the reinvestment rate of positive cash flows. We assumed that bankers could obtain funds on international markets at a maximum of 5%. We also assumed they could always reinvest the funds in standard *juros*, which the Crown normally issued at 7.14%.

<sup>26</sup> For a prominent example, see the 5 million ducat loan arranged after the 1575 bankruptcy. *Asiento y Medio General de la Hacienda*. Archivo General de Simancas; Consejo y Juntas de Hacienda; Libro 42. Modifying this assumption to a pure front-loading or a pure back-loading of interest has a negligible impact on the rest of our reconstruction and estimates.

<sup>27</sup> There is evidence that debts of the Fugger were actually serviced (but not repaid) during the defaults. The Fugger had three outstanding contracts in 1575, with a combined capital of slightly under 400,000 ducats. We have no way of knowing the actual servicing costs paid on these contracts – if any were actually paid. In any case, they would have likely not exceeded 0.004 to 0.006 million ducats – barely a trifle. Because of this uncertainty, we have maintained the assumption of zero servicing cost. Because of the fiscal accounting identity, any positive value would diminish non-military expenditures by the same amount without affecting the rest of the estimates.

<sup>28</sup> The nature of the archival record on *juros* makes it impossible to reconstruct their stock on a yearly basis in the same fashion as we have done for *asientos*. Only a small proportion of *juro* holdings at the Archivo Histórico Nacional are catalogued and accessible to researchers. There is no central registry of *juros*. The cataloguing does not allow to identify bonds belonging to a particular period – this can only be done poring by hand through each document. Furthermore, the available *juros* are not a random sample – only bonds that were re-sold at some point in time are included. Ecclesiastical institutions and noble families were large investors, and many were unlikely to ever trade the bonds they held – this is therefore a serious problem. The available data points we glean from the secondary literature were obtained through official inquiries commissioned whenever the king wanted to have an accurate idea of the stock of debt. This was particularly important around the defaults. The market for *juros*, therefore, remains a

Table 1: *Juros* and their service (in millions of ducats)

Year	Juros Servicing Cost	Outstanding Stock of Juros
1560	1.468	19
1565		25
1566	1.861	
1573	2.752	
1575	2.730	42.5
1584	3.273	
1598	4.634	68

Source: debt estimates for 1560, 1565 and 1598 are from Artola (1982, pp. 88-9); the figure for 1575 is from Carlos Morales(2008, pp. 142-3). Service estimates are from Ruíz Martín (1965, p. 71) and Ulloa (1977, pp. 828-9)

Data on *juros* are scant. Artola (1982) estimates outstanding principal in 1560, 1565, 1575 and 1598. His 1575 figure was recently revised upwards by de Carlos Morales (2008) on the basis of a contemporary account compiled by the king's treasurer. We use this revision. Ulloa (1977) and Ruíz Martín (1965) compile information on the cost of servicing *juros* in six benchmark years. Table 1 shows the available information. These data are not sufficient to compile annual estimates of long-term debt and servicing costs. We will calculate them indirectly later.

### *Expenditure*

No systematic data on Castile's expenditure during the 16<sup>th</sup> century exist. Civil administration, domestic law enforcement, and the maintenance of the royal household constituted a small part of Castile's budget – either because the expense itself was small, or because it was borne at the local level. The single largest expenditure item was military outlays. We make use of the advances made in Spanish military history in the last decade to compile comprehensive estimates of military expenditures. In the next section, we derive non-military expenditure using an accounting identity. Figure 4 presents our estimates of military expenditure between 1565 and 1596.<sup>29</sup> Where the cost of an individual campaign differs across sources, we chose the estimate supported by better documentation.<sup>30</sup> In the early 1570s, the War of the Holy League and the growing intensity of the Dutch Revolt led to a spike in military outlays, which peaked in 1574. The 1575 bankruptcy can be seen as its direct consequence. The following decade saw relatively limited military

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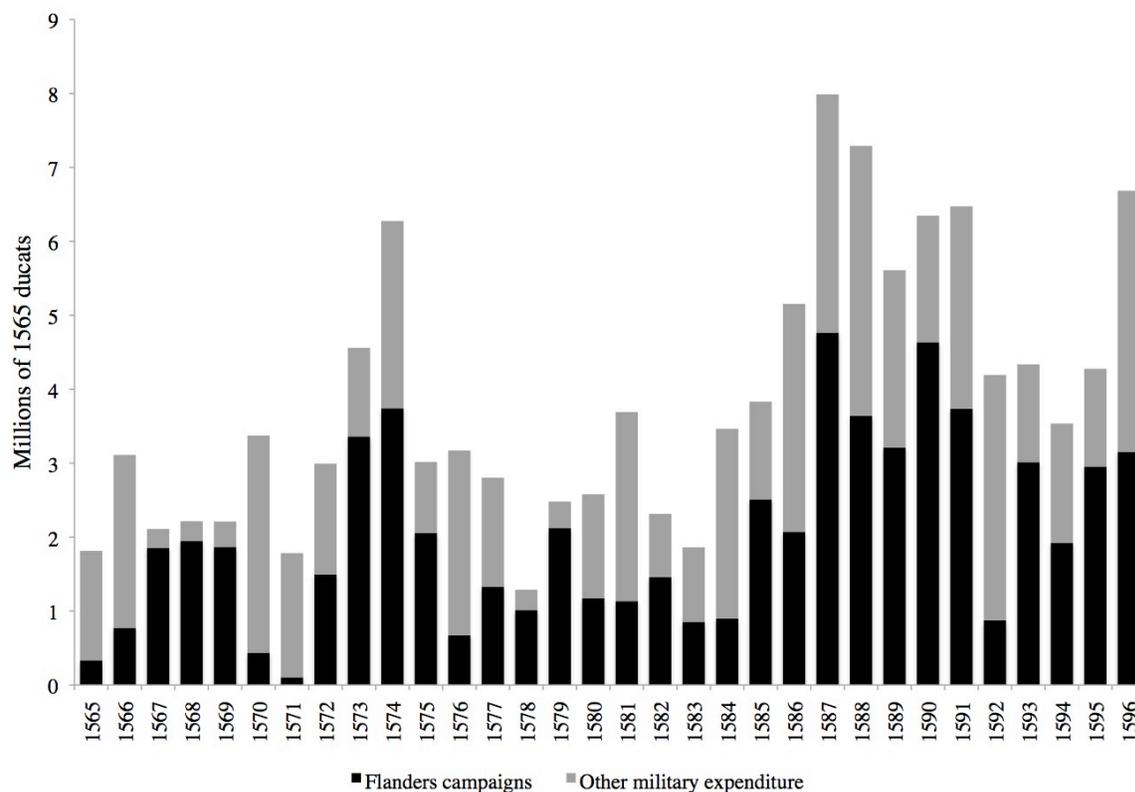
fertile, if arduous, area for research. A good overview is provided by Toboso Sánchez (1987). Ruiz Martín (1965, 1968) and Torres Lopez and Pérez-Prendes (1963) also offer useful insights.

<sup>29</sup> The standard practice throughout the Spanish empire was to use local revenue to pay for civil administration costs and also, to whatever extent possible, for military ones. These costs are not in our calculations, as they do not affect Castile's fiscal position. Our military expenditure series captures the totality of Castile's military budget. This includes transfers to the governments of disputed territories to pay for the costs of the military campaigns not covered by local revenues.

<sup>30</sup> Only one strong assumption was necessary. The contributions of the Castilian treasury to the Army of Flanders between 1580 and 1596, reported by Parker (1998), are only available as quinquennial totals. We do, however, have yearly data for the contributions paid by the Flemish treasury. To apportion the quinquennial contributions from the Castilian treasury to individual years, we assume that changes in Flemish contributions reflected the variation in total expenditure on the Dutch war. To check for robustness, we dropped the Flemish expenditures as a source of variation and used the alternative assumption that the yearly contributions of the Castilian treasury were one fifth of the quinquennial totals. This did not alter the results in any significant way.

expenditure. This changed with the resumption of hostilities in the Netherlands in 1583. Expenditure continued to rise in the run-up and aftermath of the Armada. Outfitting it cost approximately ten million ducats, roughly two years of total revenue. Following the disaster, a similar sum was spent on rebuilding the fleet to defend Spain against French and British attack. The 1596 peak – the last year for which our sources allow a comprehensive assessment – reflects the response to the treat of invasion by the combined forces of France and England.

Figure 4: Military Expenditure



Source: calculation based on data from Dandele (1995, 2001), De Lamar (1964), Koenigsberger (1951), Lynch (1961), Parker (1970, 1977, 1979, 1998, 2004), Tenace (1997, 2003), and Thompson (1976; 1992).

#### IV. SUSTAINABILITY

The previous section summarized available data derived from primary sources on revenues, short-term debt and the cost of servicing it, and military expenditure. There is also information on long-term debt and its servicing for individual years. For a comprehensive view of Castilian state finances, what is missing are series on non-military expenditures, long-term debt service, and outstanding debt. In this section, we estimate these series based on a combination of historical information, assumptions, and the logic of the government's budget constraint. We then go on to analyze the key features of fiscal performance under Philip II.

*Annual fiscal accounts*

It is helpful to write the government budget constraint as

$$\Delta d_t = ds_t - ps_t = E_t + ds_t - R_t = ME_t + NME_t + ds_t^l + ds_t^s - R_t \quad (1)$$

where  $d$  is debt,  $ps$  is the primary surplus (revenue minus non-debt expenditure),  $ds$  is debt service,  $ds^l$  and  $ds^s$  denote long- and short-term debt service,  $R$  is revenue,  $E$  is ordinary (non-debt) expenditure,  $ME$  is military expenditure, and  $NME$  is non-military expenditure. We have figures for total debt outstanding in 1565, 1575 and 1596. Because of the nature of the reschedulings, there was no short term (*asiento*) debt in these years, and the long term debt (*juros*) outstanding was equivalent to total debt. We thus know the change in total debt during the last 41 years of Philip's reign. We assume that the available information on long-term debt servicing costs (Table 1) is representative for the period as a whole. We interpolate debt servicing costs on *juros* linearly, using the data in Table 1.<sup>31</sup> This gives us a series for  $ds^l$ . After summing up equation (1) over  $t$ , it is straightforward to solve for the sum of  $NME$ , non-military expenditure. The estimated sum of non-military expenditure for the 1566-1596 period is 18.7 million ducats, compared to a total of 146.2 million ducats of military expenditure. To convert these estimates into annual figures, we assume that real non-military spending was constant throughout Philip's reign. This is a plausible assumption, as most of the expenditures of the civil administration and internal law enforcement were fixed.<sup>32</sup>

We calculate outstanding debt by adding each year's fiscal balance to the previous year's debt stock. Total debt rose markedly slower than the sum of *asientos* issued suggests. Nominal debt increased by 40.9 million ducats between 1565 and 1596. Over the same period, the Crown entered into *asiento* loans for 92.1 million ducats. Thus, on average, a little less than half of *asiento* borrowing was either rolled over into new short-term loans or consolidated into long-term debt. Our total debt series closely matches the estimates for individual years in Table 1.<sup>33</sup> Table 2 gives an overview of our results, while the full set of annual fiscal accounts is reported in Appendix E.

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<sup>31</sup> Interpolating the service on *juros* is not likely to pose a major issue for our estimations. The issuance of *juros* was capped by ordinary revenue, which grew slowly and smoothly. The major exception to this trend was the year 1575, when the Cortes authorized a large increase in ordinary revenue. We have an actual observation for that year, so our procedure captures the break in the trend.

<sup>32</sup> Since non-military spending is quite small relative to the overall budget, alternative assumptions have virtually no impact on the final estimates.

<sup>33</sup> The mean absolute difference between our estimates of total debt stock and total *juro* borrowing (matched to the nearest year) is 2.1% of our estimate.

Table 2: Fiscal Accounts, 1566-96 (period averages)

	1566-1574	1575-1584	1585-1596
<i>Panel A (nominal, million of ducats)</i>			
Revenues	5.17	7.88	9.60
Military expenditure	3.40	3.04	6.95
Non-military expenditure	0.54	0.59	0.66
Primary surplus	1.24	4.25	1.99
Long term debt service	2.35	3.00	3.91
Short term debt service	0.77	0.47	0.79
Fiscal balance	-1.89	0.78	-2.71
Outstanding debt	30.35	37.37	54.07
<i>Panel B (real, million of 1565 ducats)</i>			
Revenue	4.93	6.96	7.52
Military expenditure	3.18	2.67	5.48
Non-military expenditure	0.52	0.52	0.52
Primary surplus	1.23	3.77	1.53
Long term debt service	2.23	2.65	3.06
Short term debt service	0.72	0.41	0.62
Fiscal balance	-1.72	0.71	-2.15
Outstanding debt	28.75	32.96	42.24
<i>Panel C (% of revenue)</i>			
Military expenditure	65.8%	38.6%	72.4%
Non-military expenditure	10.4%	7.5%	6.9%
Primary surplus	24.0%	53.9%	20.7%
Long term debt service	45.5%	38.1%	40.7%
Short term debt service	14.9%	6.0%	8.2%
Fiscal balance	-36.6%	9.9%	-28.2%
Outstanding debt	587.0%	474.2%	563.2%

Source: See discussion in text and Appendix E. The deflator used to obtain the real values in panel B is the Old Castilian price index from Drelichman (2005). Panel C was derived from Panel A.

Revenues throughout Philip's reign were markedly higher than military and non-military expenditure combined. Spending excluding debt servicing costs amounted to 76 percent of revenue in the 1560s and early 1570s, fell to 46 percent in the late 1570s and early 1590s, and then increased to 79 percent. Once we take debt servicing costs into account, the budget was on average in deficit during Philip's second and fourth decade on the throne, and in surplus during the third one. Nominal revenues grew by 52 percent between 1566-74 and 1575-84, and by a further 22 percent over the next decade, for a total increase of 86 percent. Over the period as a whole, military expenditure more than doubled, and debt increased by 78 percent.

In real terms, Philip's revenues grew by 53 percent over the entire period (Panel B), while non-debt expenditure increased by 62 percent. In 1575-84, real military spending had fallen 14 percent relative to 1566-74. Philip earned a 'peace dividend' after the successful battle of Lepanto and the lull in the Dutch Revolt. Castile's budget swung into surplus as a result, having been in deficit in the years 1566-74. This surplus gave way to annual deficits of more than 2 million ducats (in 1565 prices) in the period 1585-96. Military spending then more than doubled, driven

by the Armada and renewed fighting in the Low Countries. In real terms, Philip's overall debts rose by 47 percent between the second and fourth decade of his reign – less than the increase in revenues.

Arguably, scaling by an economy's total output is the right way to measure the burden of military commitments and debt. However, estimating sixteenth-century GDP is difficult – the latest published estimates differ by more than 200 percent between their upper and lower bounds (Alvarez Nogal and Prados de la Escosura 2007). Because of the substantial uncertainty surrounding Castilian GDP, we use revenue as a scaling magnitude.<sup>34</sup> Military spending was flat relative to revenue – although with strong fluctuations. The debt burden rose marginally (Figure 5). Total debt servicing cost amounted to 60 percent of revenue in the first decade. This fell to 44 percent in the second one, and rose slightly to 49 percent in the last one. For the period as a whole, Philip II ran average fiscal deficits of approximately 20 percent of revenue. While the average deficit in the first period had amounted to 37 percent, the second period saw surpluses of 10 percent of revenue. The decade of the Armada saw a return to deficits of, on average, 28 percent.

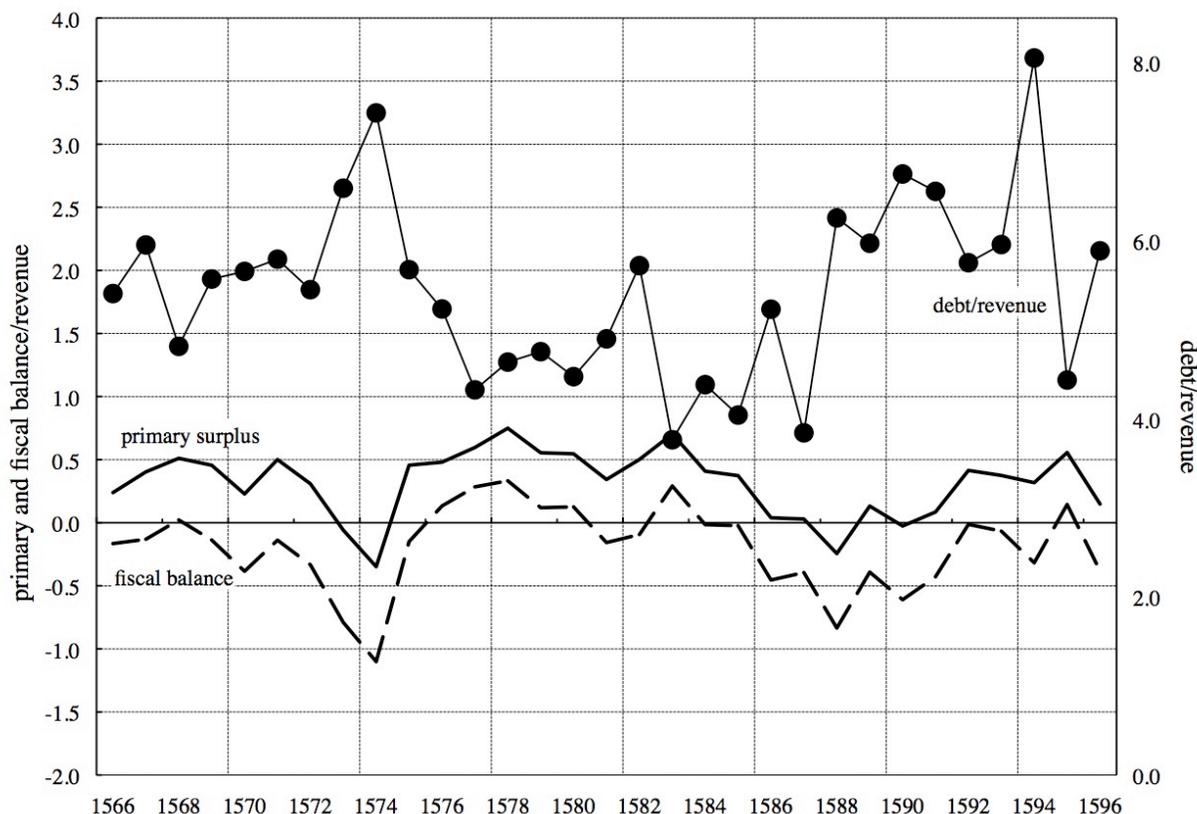
Figure 5 shows the primary surplus and fiscal balance side-by-side. The run-up to the bankruptcy in 1575 and the Armada are associated with primary deficits. After the rescheduling in 1577, and the big tax hike agreed by the Cortes, surpluses became substantial, varying between 50 and 70 percent of revenue. This return to large (primary and overall) surpluses was aided by lower military expenditure, as discussed above. Similarly, the new excises (the *millones*) coming on stream in the 1590s improved Castile's fiscal position. Overall, it ran primary surpluses equivalent to 32 percent of revenues. Despite almost continuous warfare, Philip II almost never borrowed to pay interest. Instead, a substantial proportion of his revenues was available for servicing his debts, year after year. The only exceptions to this were periods of exceptional military effort – the great Dutch offensive of the early 1570s, and the Armada.<sup>35</sup>

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<sup>34</sup> There are sound reasons to use revenue as a scaling magnitude. While modern states exert control over large portions of GDP, early modern ones did not. Creditors likely cared more about the Crown's revenue than the economy's total output when assessing a country's creditworthiness.

<sup>35</sup> Figure 5 also speaks against the main conclusions of the "serial default" literature. Following the 1575 payment stop, we do not see the downward spiral of weakening fiscal institutions predicted by Reinhart et al. (2003). Instead, due to fiscal restraint and tax hikes, the primary surplus went up.

Figure 5: Budget Balance and Debt/Revenue, 1566-96



That money formed the ‘sinews of power’, in Cicero’s famous phrase, is reflected in the effects of war on overall fiscal balance. Revenues could fluctuate from year to year, and did so largely as a result of silver windfalls or shortfalls. Debt servicing costs fluctuated, depending on the mix of short- and long-term debt, and the financing conditions in each market. Yet the prime determinant of the Crown’s fiscal position was the scale of its military effort. If we regress  $ps_t$  on  $ME_t$ , we obtain a coefficient of -1.07 (t-statistic 9.4).<sup>36</sup>

#### *Assessing sustainability*

For public debt to be sustainable, revenue and expenditures have to allow the servicing of debts in the future. Debt/income ratios should not rise above levels that are typically considered sensible, given the development of the tax system and public debt administration. Philip II’s debts did not increase relative to revenue. Taking period averages, they fell from 5.9 times annual revenue in 1566-74 to 4.8 times in 1575-84, before rising to 5.7 times in the final decade. There is therefore no evidence of a growing fiscal crisis – revenues rose faster than debt.

A more systematic approach examines sustainability through the lens of primary surpluses necessary to stabilize the debt/income ratio. For spending and borrowing to be sustainable, the long-run level of the debt to GDP ratio ought to be stable (IMF 2003). This requires that the

<sup>36</sup> This is not materially affected if we use the Newey-West correction for autocorrelation. For three lags, we obtain a t-statistic of 11.6; for 5, of 13.5.

government keep expenditure (net of the cost of debt service) below revenue, i.e. run a primary surplus. A low cost of borrowing and revenue growth can facilitate a favorable outcome. We use the debt accumulation equation from Aizenman and Pinto (2005):

$$\Delta d_t = pd_t^* + \frac{(r_t - g_t)}{(1 + g_t)} d_{t-1} = 0 \Leftrightarrow -pd_t^* = ps_t^* = \frac{(r_t - g_t)}{(1 + g_t)} d_{t-1} \quad (2)$$

where  $\Delta d$  is the change in the debt to income ratio,  $r$  is the (nominal) rate of interest,  $g$  is the growth rate of GDP,  $pd$  is the primary deficit, and  $ps^*$  is the primary surplus that will reduce  $\Delta d$  to zero, thus holding the debt-to-income ratio constant.

The approach in equation (2) can be criticized because the ‘maximum’ level of debt is not well defined. The IMF (2003) therefore proposes the following simple measure of sustainable debt:

$$D^* = PS / (r - g)$$

where  $D^*$  is the sustainable debt level. The right-hand side is simply the discounted value of future primary surpluses, where the discount rate is calculated as the difference between interest payments and the growth rate. The higher the primary surplus and the growth rate of income, the larger the debt that can reliably be serviced.

Sustainability analyses are typically performed using GDP to scale fiscal variables. We scale them by revenue instead. This is because early modern government finances are probably best judged not by a notional upper limit of national production, but by revenues actually generated. As a second step, in the section on robustness, we also use various estimates of GDP.

Table 3 shows our baseline sustainability results, comparing required and actual primary surpluses, as well as possible and actual debt levels. The analysis is performed by decade, and for Philip II’s reign overall. Primary surpluses for the period as a whole were sufficient to keep upward pressure on the debt/revenue ratio in check. The primary surplus required to stabilize the debt to revenue ratio was 35 percent of revenue, which is only slightly higher than the number attained – 31.5 percent. At the time of his death, the Crown’s debt in relation to revenue stood where it had been 33 years earlier – at a multiple of less than 6. Average sustainable debt was 5.2 times revenue, and actual levels stood at 5.5 times – a minor difference.

Table 3: Sustainability calculations – baseline results

	g	r	PS*	PS	PS-PS*	D*	D	D-D*
1565-74	3.38%	10.20%	0.394	0.249	-0.145	3.645	5.863	2.218
1574-84	3.28%	9.30%	0.433	0.454	0.020	7.534	4.787	-2.748
1584-96	3.44%	8.80%	0.227	0.201	-0.026	3.744	5.728	1.983
1565-96	3.37%	9.40%	0.348	0.315	-0.033	5.229	5.476	0.246

Note: g is the growth rate of revenue, r is the interest rate, PS is the actual primary surplus relative to revenue, PS\* is the surplus required for stabilizing the debt/revenue ratio, D is actual debt/revenue, and D\* is the debt/revenue ratio that can be sustained given actual primary surpluses. Growth rates are calculated as annualized compounded rates of growth between benchmark dates. Hence, the overall rate is not equivalent to the weighted average of the growth rates in sub-periods.

During the first decade, primary surpluses were about two-thirds of the level necessary for stability. Interest rates were relatively high, and revenue grew moderately. Debt levels were higher than could be sustained *ad infinitum*. The second decade, from 1575 to 1584, showed a decline in interest rates and a higher growth rate of revenue. Reduced military spending allowed primary surpluses to increase markedly. They were now higher than necessary to stabilize debt levels. Actual indebtedness was below the maximum sustainable level. In the final decade, military events caused expenditure to increase again. The primary surplus required for stability fell to 0.23, which is three percentage points (of revenue) higher than the actual number. For the period as a whole, our calculations show that, due to large primary surpluses, sustainability overall was not compromised, despite near-continuous warfare and major military efforts in the last two decades of the sixteenth century.

### *Robustness*

Our conclusion that Philip II's finances were largely sustainable rests on newly collected data, a reworking of existing estimates, and the derivation of information from combining these different series. At each step, we made assumptions which may affect our assessment. In this section, we examine how sustainability is affected if we use alternative indicators or assumptions.

### *Alternative Revenue Growth Rates*

In the previous section, we calculated revenue growth rates as the compound growth rate between endpoints. Results are therefore sensitive to the choice of the first and last year of the period considered. An alternative is to regress the natural logarithm of revenue on a time trend. The coefficient on the time variable will then be a measure of the average annual growth rate taking into account intra-period fluctuations. In Table 4, we show the results for the period as a whole if we use the alternative measure of revenue increases. Overall growth is somewhat lower, increasing the gap between the actual and required primary surplus. The difference nonetheless remains relatively small. The gap between sustainable and actual debt levels also increases, but it remains less than the equivalent of a year's revenues.

*Alternative GDP series*

GDP is the standard scaling variable for fiscal variables. Unfortunately, both its level and rate of change are difficult to establish for the period. We therefore relied on scaling by revenue as the main indicator of sustainability. Here we show that our main conclusion is robust to the use of GDP. The most recent GDP estimates for Castile are by Alvarez Nogal and Prados de la Escosura (2007). They give an upper and a lower bound on GDP. The difference between the two can be large – they vary on average by a factor of 3. In Table 4, we use both the upper and the lower bound, plus the midpoint to perform our sustainability calculations. As a further check, we use the figures from Carreras (2003).

Table 4: Robustness

	g	r	PS*	PS	PS-PS*	D*	D	D-D*
<i>Revenue-based</i>								
Benchmark	3.37%	9.40%	0.348	0.315	-0.033	5.229	5.476	0.246
Regression-based	2.83%	9.40%	0.345	0.315	-0.030	4.800	5.476	0.676
<i>GDP-based</i>								
Carreras	1.90%	9.40%	0.032	0.032	0.000	0.423	0.514	0.091
Alvarez-Prados - midpoint	3.40%	9.40%	0.014	0.014	0.000	0.232	0.223	0.009
Alvarez-Prados - lower bound	3.40%	9.40%	0.028	0.029	0.001	0.480	0.461	0.018
Alvarez-Prados - upper bound	3.40%	9.40%	0.009	0.009	0.000	0.153	0.147	0.006

Note: g is the growth rate of revenue, r is the interest rate, PS is the actual primary surplus relative to revenue, PS\* is the surplus required for stabilizing the debt/revenue ratio, D is actual debt/revenue, and D\* is the debt/revenue ratio that can be sustained given actual primary surpluses. Growth rates are calculated as annualized compounded rates of growth between benchmark dates. Hence, the overall rate is not equivalent to the weighted average of the growth rates in sub-periods.

Our conclusions are unaffected if we use GDP as a scaling variable, independent of the particular series employed. In each case, we find that the required and actual primary surpluses are nearly identical. With Carreras' GDP estimates, which are relatively pessimistic, there is a 9% gap between actual and sustainable debt. In any of the variations of the Alvarez-Prados figures, we find full sustainability. We do not take a stand on whether 1.9% or 3.4% growth of output is the correct number for sixteenth-century Castile, but note that even with the most pessimistic figures, the gap D-D\* is small.

*No principal reductions during defaults*

It can be argued that our analysis stacks the odds in favor of sustainability. During the 1575 and 1596 defaults, lenders saw the face value of their principal reduced. Without these adjustments, debt outstanding would have been higher. How much of the 'health' of Philip II's finances derived from the write-downs after the defaults?

We calculate a counterfactual debt series by adding debt service on the defaulted *asientos*, plus principal, to the debt stock. This ensures that in 1577, the year of the *medio general*, the counterfactual debt level is 5.5 million ducats higher than it actually was. We then scale up debt service charges in line with the new debt stock in the preceding year. This reduces primary surpluses and increases the primary deficits. Similarly, in 1596, we add the write-down from the *medio general* to the debt stock outstanding, raising it by 1.4 million ducats. Even without the default of 1577, the new taxes would have been adequate to bring debt back under control in the 1580s. Debt/revenue would have remained around a factor of 6 until the 1590s, before rising to a factor of 8. After the Armada, debt would have increased markedly more rapidly without default of 1575. The final debt stock would have been higher by the equivalent of two years' revenue. We do not know what maximum sustainable debt level is. Britain's debts in 1815 stood at 185 percent of GDP (Barro 1987). The rapid rise in debt ratios after 1588 in our counterfactual (despite a series of primary surpluses in the 1590s) could have called sustainability into doubt. In other words, up to the Armada, Spanish government finances would have been sustainable even without the default of 1575 and the 'haircut' imposed on lenders. After 1588, in contrast, Philip's actual fiscal position was more manageable partly because of the 1575 default.

#### *Alternative asiento servicing cost*

For our baseline scenario, we calculated the cost of servicing *asientos* from the cash flows in each year, based on the evidence in the complete set of contracts. One alternative is to average financing costs and duration when converting *asiento* borrowing into debt servicing costs. We assume that all (transfers, exchange, and financing) costs accrue in the first year of a loan's life. Since the average *asiento* had a duration of 18 months, this involves a certain amount of front-loading. To stack the odds against our main conclusion – that the king's debts were sustainable –, we will also use the gross value of the *asiento*, not just the borrowing component. Finally, we use an interest rate of 16%, the median rate of return on *asiento* lending plus a premium of 2% to examine robustness of our findings. The new estimate for annual *asiento* servicing costs is  $ds_t^s = AS_t \times 1.5 \times 0.16$ , where  $AS$  is the total value of *asientos* contracted. Under this assumption, the debt/revenue ratio would have increased to 6.4 instead of 5.9 – not a large difference by any standard.<sup>37</sup>

## **V. COUNTERFACTUAL – THE VALUE OF VICTORY IN THE LOW COUNTRIES**

With hindsight, we know that the Armada marked a turning point for the worse in Philip II's finances. Ex ante, it was by no means clear that Spain – which had recently routed the Ottoman fleet – would fail in this attempt. The loss of the Armada resulted in an expenditure shock. While some contemporaries were pessimistic about the Armada's prospects, others took it very seriously.

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<sup>37</sup> Under this assumption, total debt should have risen from 25 million ducats to 73 million, instead of the 66 million that we actually observe at the time of the 1596 bankruptcy. This suggests that our method of apportioning servicing costs to each year over the life of a loan is helpful in reconstructing the fiscal accounts of sixteenth-century Castile.

Sir Walter Raleigh (together with Sir Richard Grenville) was charged with the defense of Devon and Cornwall against the Armada. Writing in 1614, he observed that England was “of no such force as to encounter an Armie like unto that, wherewith it was intended that the prince of Parma should have landed in England.”<sup>38</sup> As Parker (1979) observes, had the Armada even met with limited success, Spain would have reaped large benefits.

Attempting to subdue the Dutch rebellion was arguably different. While the Armada was inspired by the need to make progress in Flanders, protracted attempts to conquer Holland cannot be construed as an unexpected expenditure shock. We argue that the benefits from peace in Holland and Zeeland were such that even the prolonged efforts of the Spanish Crown there were not inappropriate in an economic sense. Any victory, even at a late stage, would have allowed a rapid improvement of Philip II’s finances.

If the chance of ultimate success was higher than zero, then the fiscal outcome that we documented above constitutes a *lower bound* on the sustainability of Castilian finances— one that reflects what must have been the worst-case scenario in military terms based on the available information. Ex ante, it is not clear that Philip and his advisors should not have entertained reasonable hopes of suppressing the rebellion in the Dutch provinces. Few large, populous areas had ever broken away from central control in Europe – Switzerland being a notable exception. Philip’s Empire was the superpower of the age. Many contemporaries were convinced that Philip II’s *tercios* would eventually prevail.

In this subsection, we gauge how much of a difference victory in Flanders would have made to Philip’s finances. A successful conclusion of Philip II’s campaign in the Low Countries would have allowed a marked reduction in military expenditure. In addition, it may have yielded extra revenue as a result of being able to tax the rebellious provinces. We hazard conservative guesses for both figures, and argue that even relatively small changes to actual expenditure and revenue would have had a considerable impact on the overall state of Philip II’s finances.

The lull in fighting after the sack of Antwerp in 1576 illustrates how Castilian finances could change as a result of reduced military efforts. During the period 1566-96, Philip II spent 163 million ducats on non-debt expenditures, of which 144.3 went on military expenses. Of this, fully 53 percent – 77.3 million ducats – was spent on the Army of Flanders. During the Armada and its aftermath, from 1587 to 1596, expenditure in the Low Countries amounted to 40.6 million ducats. During the ten preceding years, when no major military operations took place, total expenditure on the Army of Flanders was 16.8 million ducats, 59 percent less. We assume that, had the Armada succeeded, military expenditure after a Spanish victory would have been similar to the figures for 1577-86. Thus, some 17.6 million ducats could probably have been saved from 1589 on. Note that our calculations provide a lower bound on the reduction in expenses that would have followed the

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<sup>38</sup> Quoted in Parker (1979).

Armada's success, as our figures continue to count the cost of rebuilding the decimated Atlantic fleet. Excluding it would have saved another 5.56 million ducats after 1588 (Parker 1998).<sup>39</sup>

Additional tax revenue is a more speculative source of improvement in Philip II's finances. Victory over the rebellious provinces would have allowed Philip to tax them. We take the estimates of tax revenue in Holland compiled by Fritschy (2003). To err on the side of caution, we assume that Castile would not have been as efficient in taxing its reluctant subjects as they were themselves. Therefore, we reduced the tax estimates by 50 percent. Accordingly, most of the change in Philip's fiscal position would have reflected lower expenditure (saving 2.5 million ducats in 1596) than higher revenue (adding 0.53 million).<sup>40</sup>

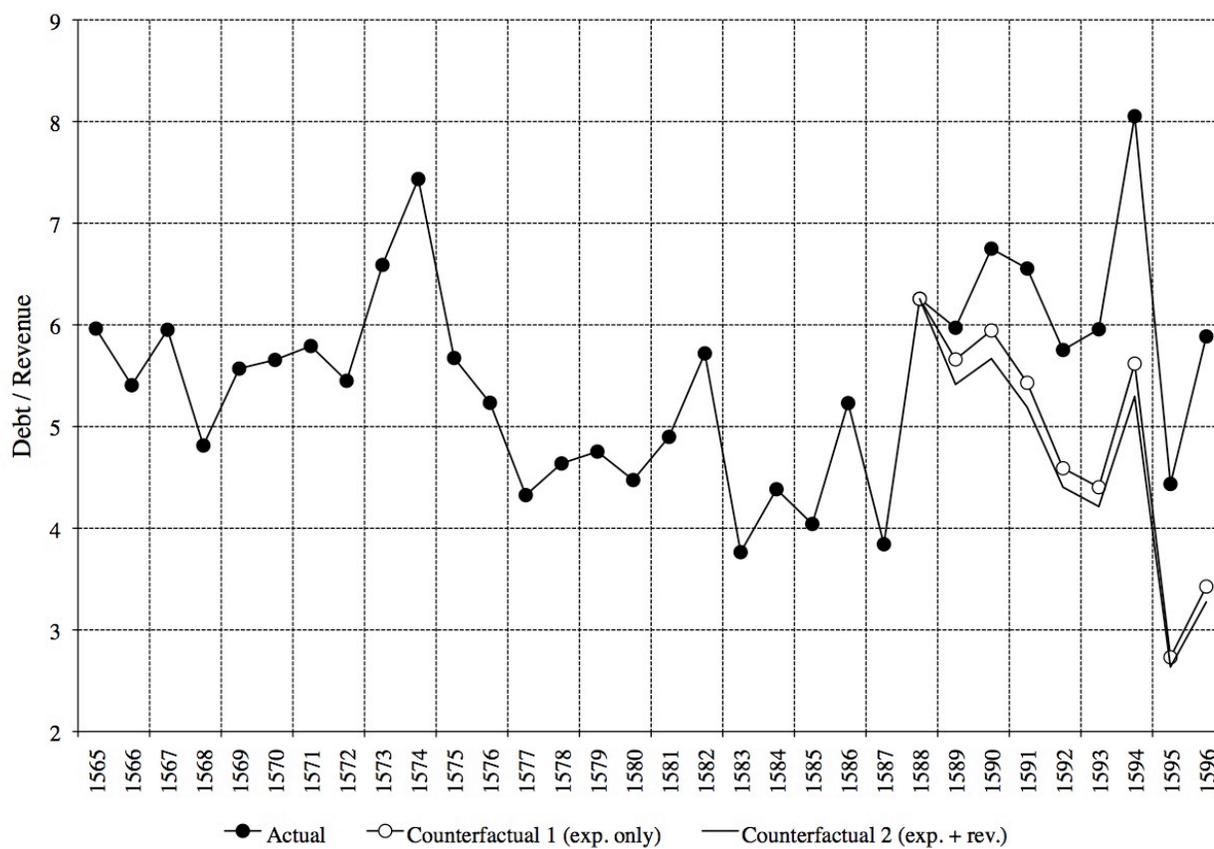
To examine the impact of lower expenditure and higher revenue on such a scale, we recalculate overall expenditure, the fiscal balance, primary surpluses, and total debt, for each year. As a result of victory in the Low Countries, Philip could have ended his reign with debts of 39 million ducats instead of 66 million. The debt/revenue ratio would have resumed the downward trend it was on before the plan for the Armada was put into motion. Figure 6 shows the two counterfactuals. The first uses only lower military expenditure, while the second adds possible revenue from Holland. The key reason why Philip's finances would have looked healthy by the end of his reign would have been less war, not more taxes. Thus, the Armada could have made good sense in fiscal terms at the time the decision was taken. This is not to say that fiscal considerations were key amongst Philip's advisors. It simply implies that religious or strategic considerations need not be the only reasons why the Armada seemed a promising project at the time.

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<sup>39</sup> The only sense in which victory in Flanders could have worsened Philip's fiscal position would have been a continuation of high-intensity warfare with England. While not impossible, we consider this unlikely.

<sup>40</sup> This is a highly conservative calculation. We do not know how much money a victorious Habsburg Empire would have extracted from the Dutch provinces, but we do know what Dutch taxes on themselves amounted to. For the period 1600-1650, average Dutch revenue amounted to 2.6 million ducats. In the final year of Philip's reign, his total revenue amounted to 11.3 million ducats.

Figure 6: Victory in Flanders – Counterfactual Debt/Revenue paths



## VI. INTERNATIONAL COMPARISONS

We now compare the state of Castile's finances with that of other major European states at the height of their power, using a variety of indicators. We chose three cases – Holland, France, and Britain. Table 5 gives an overview, drawing on a variety of sources from the European State Finance Database (Bonney 1995-2007). Two measures often used in assessing the strength of fiscal systems are the debt/revenue and debt service/revenue ratios (Sargent and Velde 1995). We explore Castile's position compared to other early modern European powers.<sup>41</sup> The Netherlands marks one extreme with an average debt service/revenue ratio of 68% percent.<sup>42</sup> France is at the opposite end of the spectrum, with a relatively low debt service/revenue ratio of 38% in the 18<sup>th</sup> century.<sup>43</sup> However, this excludes the period prior to the 1720 rescheduling, when it peaked at values in excess of 80 percent. Sixteenth-century Castile has a ratio of 51 percent. This makes it more similar to the UK than to the Netherlands.<sup>44</sup> Compared to the other great powers in early modern Europe, Castile was not spending a particularly high proportion of its revenue on debt service.

<sup>41</sup> Our data allows us to compare Castile to other European imperial powers when each was at the peak of their power. For an analytic narrative comparing Castile to other contemporary European nations, see Yun Casalilla (2004).

<sup>42</sup> Calculated from the data in the European State Finance Database compiled by t'Hart (1999).

<sup>43</sup> Inferred from Figure 1 in Sargent and Velde (1995).

<sup>44</sup> We compare the cases of Spain and the UK in somewhat greater depth in Drelichman and Voth (2008c).

Table 5: International Comparisons

	<b>UK****</b>	<b>Netherlands</b>	<b>Castile</b>	<b>France</b>
average debt service/ revenue	43% (1698-1793)	68% (1601-1712)	51% (1566-96)	38% (1720-80)
maximum debt service/revenue	70% (1784)	194% (1713)	75% (1574)	81% (1718)
growth rate of revenue	1.47% (1692-1794)	0.36% (1601-1712)	3.30% (1566-96)	1.26% <sup>++</sup> (1661-1717)
Primary surplus/ Revenue	19.5% (1698-1794)	negative	31.50% (1566-96)	14.2% <sup>++</sup> (1662-1717)
Revenue/GDP	9.1%	21.2% <sup>+</sup>	2.7%* -9.5%**	6.8% <sup>***</sup> (1788)
Debt/GDP	74% (1698-1793)		14.7* -51.4%** (1566-96)	81.1% <sup>+++</sup> (1789)

Notes: Data taken from the European State Finance Database (Bonney 1995-2007). <sup>+</sup> Per capita tax as a percentage of income of an unskilled laborer, as calculated by DeVries and Woude (1997). <sup>++</sup> Based on data used for Velde (2007), as provided by the author. <sup>+++</sup> Sargent and Velde (1995), table 1. \* GDP based on the lower bound in Alvarez Nogal and Prados de la Escosura (2007). \*\* GDP from Carreras (2003). \*\*\* Based on data by Weir (1989), as compiled by Crafts (1995). \*\*\*\* GDP data from Crafts (1995). Fiscal data from Mitchell (1988).

The same conclusion emerges when we examine the maximum debt-service/revenue ratio. The ratio peaks at 75 percent for Castile, and at 70 percent for Britain.<sup>45</sup> France saw a maximum of 81 percent.<sup>46</sup> The Netherlands sustained very high levels of close to 200 percent for a short period while it accumulated debts during the War of the Spanish Succession.

Castilian tax revenues grew quickly – more quickly than in the UK or Holland. If we compare the Castilian figure with tax increases in the other countries, we see that fiscal pressure increased at a high rate – approximately twice as fast as in the UK during the 18<sup>th</sup> century. This is all the more remarkable since historians have long held up Britain's willingness to raise taxes as one of the key factors for its success in the wars with France (Brewer 1988; O'Brien 1997). Maximum fiscal pressure in Britain and Castile was also comparable if we use Carreras's GDP figures for the latter. If we use the (more optimistic) figures by Alvarez Nogal and Prados de la Escosura, revenue/GDP was half of the British figure, and markedly lower than in Holland. Debt/GDP ratios (tentative as they are) suggest that total indebtedness in Spain was markedly less than in the UK – despite higher growth rates of revenue. Revenue/GDP (by one definition) was broadly comparable. Castile's primary surpluses were very high, even by the elevated English and French standards.<sup>47</sup> Scaling by revenue does not alter our conclusions: In 1801, for example, Britain's debt stood at a

<sup>45</sup> Note that by 1815, Britain's ratio was probably much higher (using the debt/GDP estimate by Barro (1987) suggests approximately 185%). By excluding the period of the Napoleonic wars, we are biasing our results against finding high fiscal pressure in France and Britain.

<sup>46</sup> By the late 18th century, this figure was actually lower in France than in Britain, amounting to 52% in 1788 (White 1995).

<sup>47</sup> Pre-revolutionary France also returned to primary surpluses, if only for a time. Cf. White (1989).

multiple to revenue of 13.7.<sup>48</sup> Our conclusions about the relative fiscal health of European powers echo those of White (2001).

The conclusion from international comparisons is that there was ample room for Castile's tax/GDP ratio to grow, and grow it did. To a striking extent, ordinary expenditure did not catch up with revenue. While the Castilian fiscal infrastructure was not as highly developed as in Holland or in Britain, revenue growth provided the breathing room to cope with high debts. As the sustainability calculations made clear, Castile's success in raising revenue was a key determinant of high primary surpluses. These in turn underpinned the sustainability of her debts.

## VII. CONCLUSION

In this paper, we present comprehensive annual fiscal accounts for Castile between 1566 and 1596. These series are based on new archival data, earlier estimates, and a simple national accounting framework. Our new series on short-term borrowing allows us to derive debt servicing costs. Based on these, we calculate deficit figures and fiscal surpluses, as well as an annual series of debt outstanding. Our estimates represent the earliest reconstruction of full fiscal accounts for any state in history.

'Military overstretch' has served as a key explanation for the rise and fall of great powers (Kennedy 1987). A series of early defaults is often viewed as detrimental to the development of a country's institutions and economy (Reinhart, Rogoff, and Savastano 2003). For both hypotheses, sixteenth-century Spain has been used as a prime example. Our new data show that Castile's fiscal position was much healthier than is commonly believed. The fragmentary nature of existing evidence, combined with eye-catching 'defaults', created a negative impression that is not supported by a detailed reconstruction of Philip II's finances. Debt rose during his reign, but it grew in line with revenues. According to our estimates, debt/revenue ratios stayed broadly constant. Far from excess fiscal pressure undermining the foundations of Spanish imperial might, rising revenue simply kept up with growth in population and incomes.<sup>49</sup> This, in itself, is a remarkable fact. While some years saw high expenditure – following the Duke of Alba's 'big push' in the Netherlands, and as a result of the Armada – Philip II's wars did not put state finances on an unsustainable path. This is partly because the growth of expenditures lagged behind the rise in revenues. While debt accumulated, primary surpluses grew. Philip II ran primary surpluses in all but three years of his reign. These helped to keep the debt/revenue ratio constant over time. We conclude that Spanish debts were sustainable throughout.

In comparison to other early modern European states, Castile's finances in the sixteenth century were not particularly strained. Although it spent more than the UK on servicing its debts (relative to GDP), it did better than the Dutch Provinces. And while total tax pressure was similar to the UK, maximum debt relative to revenue was actually lower. Castile's fiscal performance was

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<sup>48</sup> Mitchell (1988). In 1822, the ratio still stood at 12.96.

<sup>49</sup> On this point see also Bilbao (1990).

sustained by consistently large primary surpluses, amounting to almost a third relative to revenues – a much higher ratio than in the UK.

In the light of our findings, the bankruptcy of 1575 appears as little more than a temporary setback. The suspension of payments was triggered by an unusually strong increase in military expenditures in the two preceding years. The 1576 tax increase and the 1577 settlement effectively corrected the problem. Between 1577 and 1584, the fiscal indicators behaved similarly to the preceding two decades; growing debt was met with an increased primary surplus, and the deficit was kept under control. While the period after the 1575 bankruptcy saw consolidation, the fiscal situation deteriorated somewhat after 1588, when Philip decided to undertake the ‘Enterprise of England.’ The enormous cost of outfitting the Armada sent the budget deep into the red, virtually eliminating the primary surplus, and the threat of British invasion required more military spending. The introduction of the new *millones* tax and record silver remittances did ameliorate the king’s fiscal position, but the outbreak of the Elizabethan war (a direct consequence of the Armada and of Spain’s involvement in the struggle for the French succession) halted any significant improvement in Castile’s finances. Yet, despite these stringencies, the final bankruptcy in 1596 involved smaller ‘haircuts’ for lenders and affected a smaller amount of debt than in 1575. At the time of Philip’s death, the debt/revenue ratio was actually lower than it had been in 1566.

That Castile’s debts were sustainable is an important finding for the history of sovereign debt.<sup>50</sup> The king clearly could pay his bankers, given the overall health of his finances. With this result in hand, the next question is why a powerful monarch like Philip II mostly honored his debts? Our findings thus prepare the ground for other studies that examine what sustained sovereign lending in the case of early modern Castile. Conklin (1998) concluded that Genoese bankers could punish Philip by withholding transfer services. Alvarez Nogal (2003) argued that a centrally promoted cooperative market structure was responsible for access to credit. Elsewhere, we conclude that the sanctions view is not supported by the evidence. Instead, the importance of access to funds in the future, combined with incentives for lenders not to undermine a moratorium in case of default, made lending sustainable (Drelichman and Voth 2008b).

Our results also shed light on the nature of serial defaults. Reinhart, Rogoff and Savastano (2003) argue that countries go bankrupt repeatedly because deeper parameters in their political and social environment make repayment difficult. Borrowing, for them, can be unsafe even at low levels. Default episodes may have important negative knock-on effects on growth and the quality of fiscal institutions. Sims (2003) points out that even serial defaults may be an efficient equilibrium outcome, and that there is only limited evidence that bankruptcies harm fiscal institutions. Spain’s history of 13 defaults between 1550 and 1900 serves a prime example in the work of Reinhart, Rogoff and Savastano (2003). Our results suggest Castile’s early defaults

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<sup>50</sup> Bulow and Rogoff (1989), Eaton and Gersovitz (1981). Important contributions using historical episodes include Tomz (2007), Mitchener and Weidenmier (2010) and Eichengreen and Portes (1989).

occurred at a time of reasonable fiscal probity and broadly healthy financial conditions. While it is possible that the effect of later Spanish bankruptcies undermined its fiscal and economic position, the evidence in our period does not suggest that the quality of fiscal institutions suffered. Since the king used the defaults as a negotiating device to raise taxes on the cities, suspensions ultimately helped to strengthen the fiscal powers of the Spanish state.

During the period of our study, the Spanish empire was at the height of its powers. It also saw the forging of Philip II's 'grand strategy' (Parker 1998) and the unraveling of Spanish hegemony in the wake of military setbacks. To contemporaries, it was not clear that Philip II's strategy in the Netherlands would fail. Had it succeeded, the vast military expenditures used in the ultimately futile bid to subdue the rebels could have been saved. In addition, the rich cities of the Low Countries might have been taxed. Had the invasion of England been carried out successfully, the Crown would have saved the expense of building a second fleet, and possibly gained additional tax revenue. The defeat of 1588 dealt a sharp blow to Castile's military and financial position. In this sense, hopes of servicing all debts to the letter of each contract did not flounder on the rocks of fiscal recklessness and ineptitude, as suggested by earlier scholarship. They sank together with the Armada's ships in the English Channel. These findings suggest that bankers need not have been foolish or exuberantly optimistic to lend to Philip II. Ex ante, their chances of being repaid were probably at least as high as those of investors in British consols in the early 19<sup>th</sup> century. At that point, British government debt amounted to almost two times annual GDP (Barro 1987). That Spain would eventually hold the record for serial default, and that Britain would emerge as a textbook example of fiscal probity, may owe more to success or misfortune on the battlefield than any differences in 'fiscal discipline'.

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## Appendix A: Revenues

Year	Sales tax	Customs (internal and external)	Monopolies	Direct taxes	Millones	Church revenues	Confiscation	Indies	Total
1555	0.933	0.513	0.399	0.432	0.000	0.411	0.000	0.372	3.061
1556	0.933	0.513	0.405	0.404	0.000	0.411	0.000	0.704	3.369
1557	0.939	0.500	0.404	0.404	0.000	0.411	0.000	0.425	3.083
1558	0.939	0.497	0.404	0.404	0.000	0.307	0.000	0.644	3.195
1559	0.939	0.490	0.330	0.404	0.000	0.360	0.000	0.000	2.523
1560	0.939	0.515	0.331	0.404	0.000	0.360	0.034	0.573	3.155
1561	0.939	0.585	0.375	0.565	0.000	0.530	0.000	0.704	3.698
1562	1.277	0.690	0.440	0.537	0.000	0.531	0.000	0.199	3.674
1563	1.277	0.725	0.483	0.537	0.000	0.533	0.000	0.455	4.011
1564	1.277	0.774	0.542	0.404	0.000	0.807	0.000	0.474	4.278
1565	1.277	0.777	0.575	0.404	0.000	0.807	0.000	0.352	4.192
1566	1.277	0.828	0.532	0.404	0.000	0.807	0.000	0.921	4.770
1567	1.277	1.095	0.501	0.432	0.000	0.554	0.202	0.368	4.430
1568	1.277	1.108	0.505	0.404	0.000	0.522	0.427	1.210	5.453
1569	1.277	1.098	0.484	0.404	0.000	0.360	0.260	0.949	4.832
1570	1.277	1.129	0.520	0.537	0.000	0.554	0.079	1.010	5.106
1571	1.277	1.083	0.537	0.537	0.000	0.597	0.008	1.068	5.107
1572	1.277	1.082	0.527	0.537	0.000	1.200	0.554	0.605	5.781
1573	1.277	1.086	0.549	0.432	0.000	1.200	0.181	0.708	5.433
1574	1.277	0.957	0.587	0.404	0.000	1.316	0.411	0.700	5.652
1575	3.091	0.942	0.616	0.404	0.000	1.018	0.619	0.917	7.606
1576	3.715	0.962	0.579	0.404	0.000	1.260	0.135	0.988	8.043
1577	3.715	0.989	0.583	0.404	0.000	1.233	0.040	2.168	9.132
1578	2.715	0.989	0.661	0.404	0.000	1.431	0.301	1.448	7.948
1579	2.715	1.001	0.652	0.444	0.000	1.290	0.025	1.437	7.563
1580	2.715	0.997	0.636	0.404	0.000	1.286	0.042	1.739	7.818
1581	2.715	0.996	0.592	0.404	0.000	0.933	0.000	1.737	7.377
1582	2.715	0.980	0.442	0.404	0.000	1.336	0.049	0.498	6.422
1583	2.715	0.993	0.472	0.404	0.000	1.274	0.000	3.200	9.057
1584	2.715	0.993	0.472	0.404	0.000	1.299	0.067	1.857	7.806
1585	2.715	0.993	0.472	0.439	0.000	1.310	0.359	2.226	8.514
1586	2.715	0.999	0.533	0.404	0.000	1.314	0.350	0.890	7.204
1587	2.715	1.002	0.524	0.404	0.000	1.432	0.382	4.472	10.931
1588	2.755	0.984	0.595	0.404	0.000	1.211	0.281	1.519	7.748
1589	2.755	0.983	0.529	0.404	0.000	1.338	0.356	2.322	8.687
1590	2.755	1.000	0.869	0.404	0.000	1.384	0.202	1.836	8.449
1591	2.755	1.013	0.896	0.444	1.338	1.378	0.788	0.697	9.309
1592	2.755	0.944	0.825	0.404	1.338	1.380	0.000	2.985	10.630
1593	2.755	1.009	0.912	0.404	1.338	1.283	0.592	2.089	10.382
1594	2.755	1.015	0.816	0.404	1.338	1.438	0.230	0.000	7.996
1595	2.755	1.017	1.010	0.404	1.333	1.476	0.325	5.738	14.058
1596	2.755	1.026	0.784	0.404	1.333	1.501	0.108	3.418	11.328

Note: all figures are in millions of current ducats.

## Appendix B: Comparing the new revenue series with existing estimates

One obvious exercise is to contrast our estimate with existing information for benchmark years. For this purpose we use the very limited data compiled by Artola (1982). His figures are the result of Crown inquiries, called *averiguaciones*, ordered in times of crisis. Table B1 compares our revenue estimate to Artola's figures for the years of 1560, 1565 and 1577, and Ulloa's estimate 1598

Table B1: Revenue in benchmark years (in ducats)

Year	Revenue (benchmarks )	Revenue (our estimate)
1560	4,192,237	3,154,551
1565	5,600,000	4,192,126
1577	8,700,000	9,131,704
1598	9,731,408	n/a

Source: Artola (1982), Ulloa (1977), authors' calculations.

In 1577, our estimates and the benchmarks are fairly close. Our series does not reach as far as 1598, but our average estimates for the 1590s are also close to Ulloa's. In the early years, however, we are 25% below the benchmark figures. Artola's data for those years comes from Ruíz Martín (1965). The discrepancy arises because Ulloa (on whose work our estimate relies) only tabulated confirmed revenues, thus missing a number of income streams for which no data has survived; Ruíz Martín, on the other hand, worked with contracted revenues, which were almost always higher than what the Crown actually received. Ulloa's numbers are therefore a lower bound for the true revenue figures, while Artola (1982) himself cautions that Ruíz Martín's figures, and hence his own, are a high upper bound.

## Appendix C: the *Medios Generales* of 1577 and 1597

The *medio general* of 1577 settled the suspension of payments of September 1, 1575. This account is taken directly from the original document subscribed by the king and the bankers, preserved in the Archive of Simancas. Its location is *Asiento y Medio General de la Hacienda*. Archivo General de Simancas; Consejo y Juntas de Hacienda; Libro 42.

The king recognized outstanding obligations for 15,184,464 ducats, divided 14,600,446 ducats of outstanding principal as of September 1, 1575, and 584,018 ducats in interest accrued between September 1 and December 1, 1575. It is not clear why this interest was added; in any event, the first provision of the settlement was to write it off. We work from the outstanding capital at the time of the suspension, 14.6 million ducats.

Of the total outstanding *asientos*, 5,580,313 ducats were collateralized by perpetual *juros* with a yield of 7.14% guaranteed by ordinary revenues. The holders of these *juros* were allowed to keep them, but their annuity rate was reduced to 5%. Compared to the 7.14% that had been contracted, the reduction in the annuity rate amounts to a write-off of 1,672,531 ducats.

A further 4,375,994 ducats worth of *asientos* were collateralized by perpetual *juros* with a yield of 5% guaranteed by the revenues of the *Casa de la Contratación*. The *Casa* was inefficient administered, and too many *juros* were chasing too few revenues. As a result, these *juros* were often not serviced; in the secondary market they traded at around 50% of their face value. The Crown recognized 55% of *juros de contratación* at face value by converting them to 5% perpetuities guaranteed by ordinary revenues. The remainder 45%, 1,969,197 ducats' worth, were treated as uncollateralized debt.

Uncollateralized debt, which amounted to 6,613,336 ducats including the *juros de contratación*, suffered the harshest treatment. Two thirds of it was converted into perpetuities of the same face value yielding 3.3%. The remaining third was converted into tax farms on small towns (*vasallos*) with a nominal yield of 2.3%. The write-off on this portion of the debt relative to a 7.14% interest rate amounts to 3,829,684 ducats.

In total, the 1575 *medio general* rescheduled a total of 14,600,446 ducats of short term debt, on which it imposed a writedown in principal of 5,502,214 ducats, or 37.69% of the loans in default.

The 1596 bankruptcy, which we describe following Ulloa (1977, p. 823) and Neri (1989, p. 109), was mild in comparison. The 1597 settlement rescheduled a total 7,048,000 ducats. Two thirds, or 4,698,667 ducats' worth, were converted into 5% perpetual *juros*. Using the same interest rate assumption as for the 1575 settlement, this would imply a haircut of 1,409,600 ducats. The remaining third was guaranteed by 12.5% lifetime *juros* in possession of the bankers; these lifetime bonds had been issued in 1580, and hence were halfway through their accounting life expectancy of 33 years. The settlement stipulated that they were to be swapped by 7.14% perpetual *juros*; the bankers would be given enough perpetual *juros* so as not to alter the present value of the principal. In short, this portion of the outstanding debt suffered no write off; the king lengthened the repayment schedule at the cost of increasing the face value of the bonds. The total write-off of the 1597 settlement was therefore 1,408,284 ducats, or exactly 20% of the amount defaulted upon.

**Appendix D: A new series of asientos.**

Year	Gross value of new issues	Loan component of new issues	Service
1566	1.174	0.982	0.066
1567	6.046	4.066	0.377
1568	0.687	0.670	0.549
1569	2.918	2.401	0.620
1570	1.904	1.234	0.758
1571	3.792	3.054	0.765
1572	5.916	4.665	1.087
1573	2.983	2.304	1.223
1574	5.634	4.304	1.513
1575	4.955	4.589	1.876
1576	0.890	0.000	0.000
1577	6.193	5.000	0.000
1578	0.107	0.107	0.401
1579	0.000	0.000	0.320
1580	0.761	0.502	0.258
1581	0.325	0.311	0.594
1582	1.764	0.908	0.667
1583	0.467	0.153	0.521
1584	0.320	0.000	0.034
1585	0.000	0.000	0.003
1586	2.497	1.331	0.084
1587	5.764	5.470	1.074
1588	1.834	1.628	0.912
1589	5.697	4.271	0.787
1590	4.644	3.275	1.078
1591	3.573	2.559	0.825
1592	0.779	0.609	0.495
1593	2.760	2.241	0.434
1594	7.058	7.021	0.830
1595	6.475	6.202	1.444
1596	4.214	4.123	1.567

Note: all figures are in millions of current ducats.

### Appendix E: Reconstruction of Castile's fiscal accounts, 1566-1596.

Year	Revenue	Military expenditure	Non-military expenditure	Primary surplus	Long term debt service	Short term debt service	Fiscal balance	Outstanding debt
1566	4.770	3.110	<i>0.520</i>	1.139	1.861	0.066	-0.788	25.788
1567	4.430	2.120	<i>0.525</i>	1.785	<i>1.988</i>	0.377	-0.581	26.369
1568	5.453	2.139	<i>0.530</i>	2.784	<i>2.116</i>	0.549	0.119	26.250
1569	4.832	2.095	<i>0.535</i>	2.201	<i>2.243</i>	0.620	-0.662	26.911
1570	5.106	3.401	<i>0.540</i>	1.164	<i>2.370</i>	0.758	-1.964	28.875
1571	5.107	2.006	<i>0.545</i>	2.556	<i>2.497</i>	0.765	-0.706	29.582
1572	5.781	3.446	<i>0.551</i>	1.785	<i>2.625</i>	1.087	-1.926	31.508
1573	5.433	5.195	<i>0.556</i>	-0.318	2.752	1.223	-4.292	35.800
1574	5.652	7.060	<i>0.561</i>	-1.969	<i>2.741</i>	1.513	-6.223	42.023
1575	7.606	3.572	<i>0.566</i>	3.468	2.730	1.876	-1.138	43.161
1576	8.043	3.612	<i>0.572</i>	3.859	<i>2.790</i>	0.000	1.068	42.093
1577	9.132	3.110	<i>0.577</i>	5.444	<i>2.851</i>	0.000	2.594	39.499
1578	7.948	1.412	<i>0.583</i>	5.954	<i>2.911</i>	0.401	2.642	36.857
1579	7.563	2.781	<i>0.588</i>	4.194	<i>2.971</i>	0.320	0.902	35.955
1580	7.818	2.954	<i>0.594</i>	4.270	<i>3.032</i>	0.258	0.980	34.975
1581	7.377	4.250	<i>0.600</i>	2.528	<i>3.092</i>	0.594	-1.159	36.134
1582	6.422	2.599	<i>0.605</i>	3.218	<i>3.153</i>	0.667	-0.601	36.735
1583	9.057	2.074	<i>0.611</i>	6.372	<i>3.213</i>	0.521	2.638	34.097
1584	7.806	4.001	<i>0.617</i>	3.188	3.273	0.034	-0.120	34.217
1585	8.514	4.714	<i>0.623</i>	3.177	<i>3.371</i>	0.003	-0.196	34.413
1586	7.204	6.294	<i>0.629</i>	0.282	<i>3.468</i>	0.084	-3.270	37.682
1587	10.931	9.977	<i>0.635</i>	0.319	<i>3.565</i>	1.074	-4.320	42.002
1588	7.748	9.002	<i>0.641</i>	-1.894	<i>3.662</i>	0.912	-6.468	48.470
1589	8.687	6.894	<i>0.647</i>	1.146	<i>3.759</i>	0.787	-3.401	51.871
1590	8.449	8.017	<i>0.653</i>	-0.220	<i>3.856</i>	1.078	-5.155	57.026
1591	9.309	7.858	<i>0.659</i>	0.792	<i>3.954</i>	0.825	-3.987	61.013
1592	10.630	5.558	<i>0.665</i>	4.406	<i>4.051</i>	0.495	-0.140	61.153
1593	10.382	5.819	<i>0.672</i>	3.891	<i>4.148</i>	0.434	-0.691	61.845
1594	7.996	4.780	<i>0.678</i>	2.538	<i>4.245</i>	0.830	-2.538	64.383
1595	14.058	5.556	<i>0.684</i>	7.818	<i>4.342</i>	1.444	2.032	62.351
1596	11.328	8.961	<i>0.691</i>	1.676	<i>4.440</i>	1.567	-4.331	66.682

Note: All figures are in millions of current ducats. Italics denote imputed missing data. Positive figures in the fiscal balance column are surpluses, negative ones are deficits.

### Appendix F: Price index for Old Castile (1565=100).

Year	Index
1565	100.00
1566	99.98
1567	100.49
1568	96.56
1569	94.75
1570	100.83
1571	112.45
1572	115.12
1573	113.94
1574	112.50
1575	118.41
1576	113.93
1577	110.92
1578	109.63
1579	112.12
1580	114.52
1581	115.12
1582	112.27
1583	111.43
1584	115.45
1585	123.00
1586	122.11
1587	124.90
1588	123.46
1589	122.89
1590	126.29
1591	121.39
1592	132.58
1593	134.20
1594	135.15
1595	129.93
1596	134.07

Note: compiled from Drelichman (2005), using a weighted average with 2/3 weight on the traded goods index and 1/3 on the non-traded goods index for Old Castile, and converted to a 1565 base.