



# IMPACT OF FINANCIAL DEVELOPMENT AND TRADE BARRIERS ON GVC PARTICIPATION OF SOUTHERN MEDITERRANEAN COUNTRIES

*Rawan Shaarawy*





**FEMISE CONFERENCE PAPER**

**SHIFTING PARADIGMS:**

**Opportunities for a Deeper EU-Mediterranean Integration in a Changing World**

**IMPACT OF FINANCIAL DEVELOPMENT AND TRADE BARRIERS ON GVC PARTICIPATION  
OF SOUTHERN MEDITERRANEAN COUNTRIES**

**Authors:**

**Rawan Shaarawy**, Economic Researcher, Egyptian Competition Authority, Egypt

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## ABSTRACT

This paper studies the effects of financial development and trade barriers in a country on its level of participation in a Global Value Chain (GVC) with a focus on the Euro Mediterranean (EU-Med) region during the period between 2000 and 2018. To explore this relationship, the paper focuses on the financial development in terms of the ease of provision of sources of finance such as access to credit to private sector, in addition to tariff and Regulatory trade barriers as important factors affecting countries' integration in GVCs. This paper empirically links two literature strands: the first one tackling the effect of facilitating access to credit and sources of finance on GVC participation and the second one analyzing the effect of trade barriers on GVC participation, in addition to examining the effect of their interaction on GVC participation in the EU-Med region. In order to examine this relationship, extended regression model (ERM) is used. The results of this paper show that countries developed financially are more likely to increase their engagement in GVCs, and that countries who impose high trade barriers tend to have lower participation rate in GVCs. The interaction results show that the negative effect of trade barriers outweighs the positive effect of financial development on GVC participation, and that financial development attenuates the negative effect of trade barriers on GVC participation, particularly with respect to forward linkages. From a policy perspective, countries may stimulate their participation in GVCs by reducing trade barriers and insuring financial development by facilitating businesses' access to different sources of credit. Further, they must reduce the financial burden on businesses by exempting the nascent and most innovative businesses from taxes for a certain number of years in order to encourage the businesses to export and to participate in GVCs.

**Jel classification:** F10, F38, G15, G19

**Keywords:** GVC participation, financial development, tariffs, regulatory trade barriers

## Impact du développement financier et des barrières commerciales sur la participation aux chaînes de valeur mondiales des pays du Sud de la Méditerranée

### RÉSUMÉ

Cet article analyse les effets du développement financier et des barrières commerciales dans un pays sur son niveau de participation à une Chaîne de Valeur Mondiale (CVM), en se focalisant sur la région Euro-Méditerranée (Euromed) pendant la période de 2000 à 2018. L'étude examine la manière avec laquelle le développement financier, notamment la facilité d'accès au crédit pour le secteur privé, ainsi que les barrières tarifaires et réglementaires, influencent l'intégration des pays dans les CVM. L'article établit un lien empirique entre deux domaines de recherche : le premier évalue l'impact de l'amélioration de l'accès au crédit et aux sources de financement sur la participation aux CVM, tandis que le second analyse l'effet des barrières commerciales sur cette participation, en considérant également l'effet combiné de ces deux facteurs dans la région Euromed. Pour examiner cette relation, le modèle « Extended Regression Model » est utilisé. Les résultats indiquent que les pays ayant un développement financier avancé sont plus susceptibles d'augmenter leur engagement dans les CVM, tandis que les pays imposant des barrières commerciales élevées tendent à avoir un taux de participation plus bas dans les CVM. Les résultats de l'interaction montrent que l'effet négatif des barrières commerciales l'emporte sur l'effet positif du développement financier sur la participation aux CVM, et que le développement financier atténue l'effet négatif des barrières commerciales sur la participation aux CVM, en particulier en ce qui concerne les liens en amont. Du point de vue politique, les pays peuvent stimuler leur participation aux CVM en réduisant les barrières commerciales et en favorisant le développement financier en facilitant l'accès des entreprises à différentes sources de crédit. De plus, ils doivent alléger le fardeau financier des entreprises en exonérant les entreprises naissantes et les plus innovantes de taxes pendant un certain nombre d'années afin d'encourager ces entreprises à exporter et à participer aux CVM.

**Classification Jel :** F10, F38, G15, G19

**Mots-clés :** participation aux CVM, développement financier, tarifs, barrières commerciales réglementaires

## التنمية المالية والحواجز التجارية والمشاركة في سلاسل القيمة العالمية

### ملخص

يستعرض هذا البحث تأثير التنمية المالية والحواجز التجارية في الدولة على مستوى مشاركتها في سلسلة القيمة العالمية، مع التركيز على المنطقة الأورو-متوسطة خلال الفترة من 2000 إلى 2018. يستكشف البحث العلاقة بين التنمية المالية وسهولة الوصول إلى مصادر التمويل، مثل الائتمان للقطاع الخاص، بالإضافة إلى تأثير الحواجز الجمركية والحواجز التجارية التنظيمية كعوامل رئيسية تؤثر على اندماج الدول في سلسلة القيمة العالمية. يدمج هذا البحث بشكل تجريبي بين محورين من الأدبيات؛ الأول يتناول تأثير تسهيل الوصول إلى الائتمان ومصادر التمويل على المشاركة في سلسلة القيمة العالمية، بينما يحلّل الثاني تأثير الحواجز التجارية على هذه المشاركة، بالإضافة إلى دراسة تأثير التفاعل بين تسهيل الوصول إلى الائتمان والحواجز التجارية على المشاركة في سلسلة القيمة العالمية في المنطقة الأورو-متوسطة. ولتحليل هذه العلاقة، تم استخدام نموذج " Extended Regression Model". تكشف النتائج أن الدول ذات التنمية المالية المتقدمة تكون أكثر احتمالاً لزيادة مشاركتها في سلسلة القيمة العالمية، بينما الدول التي تفرض حواجز تجارية مرتفعة تميل إلى أن تكون مشاركتها في سلسلة القيمة العالمية أقل. كما توضح نتائج التفاعل بين تسهيل الوصول إلى الائتمان والحواجز التجارية أن التأثير السلبي للحواجز التجارية يتفوق على التأثير الإيجابي للتنمية المالية على المشاركة في سلسلة القيمة العالمية، وأن التنمية المالية تخفف من التأثير السلبي للحواجز التجارية على المشاركة في سلاسل القيمة العالمية، خاصةً فيما يتعلق بالروابط الأمامية. ومن منظور السياسات، يمكن للدول تعزيز مشاركتها في سلسلة القيمة العالمية من خلال تقليل الحواجز التجارية وضمان التنمية المالية عبر تسهيل وصول الشركات إلى مصادر الائتمان المتنوعة. بالإضافة إلى ذلك، ينبغي تخفيف العبء المالي على الشركات عبر إعفاء الشركات الناشئة والأكثر ابتكاراً من الضرائب لعدة سنوات بهدف تشجيعها على التصدير والمشاركة في سلسلة القيمة العالمية.

تصنيف Jel: F10, F38, G15, G19

الكلمات المفتاحية: المشاركة في سلسلة القيمة العالمية، التنمية المالية، الحواجز الجمركية، الحواجز التجارية التنظيمية

## INTRODUCTION

Globalization has created a dynamic environment where products are not exclusively manufactured within a single country, because production activity is based on outsourcing and offshoring tasks which allows several countries of the world to contribute to the manufacturing process (OECD, 2013). The twenty-first century's trade has witnessed the emergence of Global Value Chains (GVCs) where production stages are dispersed internationally (Rigo, 2020), and the process is fractionalized into specific phases and tasks scattered worldwide. The main advantage of GVCs is that they create more integrated and interdependent economies worldwide, since several developed and developing countries integrate the chain and start exporting depending on their level of comparative advantage (Dovis and Zaki, 2020).

Within the Euro Mediterranean (EU-Med) region,<sup>1</sup> economies are actively integrating in GVCs and in globalized networks of trade and investment in order to diversify exports and ensure more inclusive and sustainable economic growth (OECD, 2018). In this regard, Morocco and Tunisia engage in GVCs in the textile sector, and in the electrical equipment sector with major trading partners namely France, Italy, Germany and Spain due to their geographical proximity to the EU (OECD, 2015). Moreover, Egypt participates in GVCs, and especially in fuel and food supply chains. It also exports raw materials and intermediate goods, particularly in petrochemicals and textile products (EBRD, 2020).

Several EU-Med countries engage simultaneously in forward linkages, by specializing in upstream stages and exporting commodities, raw materials and low value-added products, and in backward linkages, by specializing in downstream stages and exporting high value-added products and services such as marketing activities and research and development (R&D). For instance, Jordan participates in upstream and downstream stages of GVCs according to its comparative advantage in the different sectors. On one hand, Jordan possesses large natural resources of phosphate and potash; accordingly, it exports the natural resources to other countries, and contributes to the forward GVCs in the chemicals and mineral industries. On the other hand, Jordan participates in backward GVCs in the apparel and textile industries (EBRD, 2020).

In terms of financial development, European countries are more financially developed compared to South Mediterranean Countries (SMC), reflecting the difference in the level of development of their countries. EU countries provide credit to private sector more than SMCs which are in the middle among developing regions in terms of credit provided to private sector (Arzeki and Senbet, 2020). However, some of the

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<sup>1</sup> EU-Med region includes 35 countries which are the 27 countries of the EU and the 8 South Mediterranean countries (SMCs) namely: Algeria, Egypt, Jordan, Israel, Lebanon, Morocco, Palestine and Tunisia



SMCs started providing credit to private sector, for example, Egypt has adopted several policies facilitating access to credit to private sector and to promote financial inclusion. In Egypt, Egypt's National Structural Reforms Program, which is aligned with Sustainable Development Strategy has a pillar aiming to stimulate financial inclusion to private sector between 2021 and 2024. Besides, Egypt has provided fiscal incentives of around 10% to 20% of exported value added for digital services. Additionally, Egypt Investment Law No. 72/2017 offers financial incentives for investing in export-oriented projects. These incentives take the form of customs tax and duty exemptions and reductions for new investment projects. There are also several facilitations to exporters such as non-repayable financial contributions.

With regards to trade barriers, the governments of SMCs tend to protect their industries by employing tariff and non-tariff barriers. Nevertheless, there are significant efforts to reduce these trade barriers. This paper studies the effect of financial development, trade barriers and GVC participation in the EU-Med region during the period between 2000 and 2018. It aims to highlight the extent to which financial development of EU-Med governments may affect the countries' GVC participation level, furthermore, it tackles how trade barriers may impact GVC participation, and finally, it assesses the effect of the interaction between the efforts of EU-Med governments to ensure financial development, in addition to trade barriers imposed in the region on the countries' GVC participation level. The paper contributes to the existing pool of literature in several ways: firstly, it is a pioneering paper providing a bridge between two strands of literatures: the first studying the relationship between financial development offered to businesses such as access to credits and GVC engagement, and the second analyzing the effect of trade barriers on GVC participation. Further, it empirically tackles the effect of the interaction between financial development and trade barriers, and it studies their effect on GVC participation. Secondly, it is the first paper to use Extended Regression Methodology (ERM) in this research area. This technique has many benefits because it solves the endogeneity problem which may arise between GVC participation and financial development by allowing the use of instruments, moreover it allows the interaction between endogenous and exogenous variables.

The outline of the paper is structured as follows: section 2 highlights the literature review on the effect of financial development and trade barriers on GVC participation. Section 3 presents the data and the descriptive statistics on the relationship between financial development, trade barriers and integration in GVCs. Section 4 outlines the methodology for estimating this relationship. Section 5 analyzes the empirical findings of the paper; section 6 presents some robustness checks and section 7 concludes and provides policy recommendations.

## LITERATURE REVIEW

This subsection presents the literature tackling first the effect of financial development on GVC participation. Second, it focuses on the literature strand highlighting the effect of trade barriers on GVC participation.

### THE EFFECT OF FINANCIAL DEVELOPMENT ON GVC PARTICIPATION

GVC participation is significantly affected by a country's internal policies, particularly those related to its financial systems. A more developed financial environment can enhance the country's trade flows and promote a greater involvement in GVCs. To successfully integrate and scale up within GVCs, countries need to be financially developed for several reasons; firstly, a less diversified financial system can deter investors, and undermine business confidence, which in turn hampers the establishment of commercial relationships necessary for GVC participation. Secondly, firms looking to engage in GVCs typically need to interact with formal financial institutions to secure the necessary resources and support (Efogo, 2020).

Efogo (2020) studies the effect of financial development on GVC participation for 36 African countries during the period between 2000 and 2018. His study reveals that although African countries participation in GVCs is weak, financial development has a vital role in increasing the participation of African countries in GVCs, and that financial development controls the decisions to enter, set up and upgrade within a GVC.

There is a large part of the literature that studies access to credit and for GVC participation. from a microeconomics perspective (Wignaraja, 2013; Van Biesebroeck, 2014; Bellone et al., 2018). A common finding is that countries with more accessible financial systems, allowing businesses easier access to finance and credit, tend to have higher GVC participation rates. In this context, Wignaraja (2013) highlights that firms having access to credit for working capital such as banks are more inclined to engage in GVCs compared to firms relying on internal financing or other informal sources of finances. This is because firms relying on banks to finance their business are more organized and bear lower costs compared to firms that may rely on more expensive informal sources of finance.

Moreover, better access to financial institutions expands firms' probability of internationalization (Bellone et al., 2008). Entering export markets and participating in GVCs involve significant sunk entry costs, and only firms with fewer financial constraints are able to undertake these investments (Bernard and Wagner, 2001; Bernard and Jensen, 2004). Accordingly, firms with better access to external financial resources exhibit greater efficiency, which enables them to enter international markets and diversify their sales internationally (Campa and Shaver, 2002).

## THE EFFECT OF TRADE BARRIERS ON GVC PARTICIPATION

Countries' engagement in GVCs is affected by their trade policies; studies indicate that bilateral trade barriers are more likely to restrict countries' engagement in GVCs (Kriljenko et al., 2016; Eugster et al., 2022), in this context, Cheng et al. (2015) prove that economies facing higher tariffs on intermediate imports have lower GVC participation, accordingly, emerging Asian economies show lower GVC participation rates since they impose high tariffs on their intermediate inputs. Cheng et al. further decompose the effect of tariffs on backward and forward linkages, they find that the negative effect of tariffs on backward GVC participation is more pronounced than that on forward GVC participation. This is because in GVC context, intermediary goods often cross the borders multiple times, which is hampered by tariffs (Korwatanasakul and Baek, 2021).

Similarly, Allard et al. (2016) employ a gravity model to analyze trade data for 167 countries from 1980 to 2013 using the IMF's Direction of Trade Statistics database. Their findings reveal that sub-Saharan Africa suffer from high trade barriers, and that reducing tariffs in sub-Saharan Africa to levels closer to those in non-sub-Saharan Africa could enhance backward GVC integration. Eugster et al. (2022) corroborates these results, showing that increased domestic protection hinders the country's engagement in GVCs.

Further supporting these conclusions, Fernandez et al. (2020) analyze the determinants of GVC participation across 100 countries over the past three decades. They find that lower tariff rates are crucial for promoting GVC participation, as higher tariff rates not only increase import costs, but also diminish the potential gains from GVCs, thereby reducing GVC participation. Similarly, Yannikkaya et al. (2022) assess the impact of tariffs on GVC participation using value-added trade statistics and cumulative tariff rates for 12 sectors across 168 countries between 1990 and 2015. Their analysis shows that high tariff rates adversely affect sectoral GVC participation.

Additionally, Kriljenko et al. (2016) investigate both tariff and non-tariff barriers, and they find that both types of barriers inhibit trade and GVC participation. Furthermore, Korwatanasakul and Baek (2021) conduct a cross-sectional analysis for 19 industrial sectors in 30 countries in 2015. The results confirm that both tariff and non-tariff measures have a detrimental effect on GVC participation, with non-tariff measures having a more substantial effect than tariffs.

## DATA AND STYLIZED FACTS

This section provides descriptive statistics of the data used in analyzing the effect of financial development and trade barriers on GVC participation.

### DATA

In order to analyze the effect of financial development and trade barriers on GVC participation, data is obtained for 35 EU-Med countries namely Algeria, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Jordan, Latvia, Lebanon, Lithuania, Luxembourg, Malta, Morocco, Netherlands, Palestine, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and Tunisia during the period between 2000 and 2018.

The variables of interest are GVC participation, financial development and trade barriers. In order to measure GVC participation, following Casella et al., (2019), several measurements are extracted from the UNCTAD-Eora GVC database<sup>2</sup> which was initially launched in the context of the analysis of the World Investment Report 2013 (WIR13). The first measurement takes into consideration the Foreign Value Added (FVA) embodied in this country's exports and measures the backward GVC participation component of the GVC participation index. The second measurement studies the Domestic Value Added embodied in the exports of other countries, corresponding to the forward GVC participation component of the participation index (DVX). The third measurement is the GVC participation index for this country, which equals to the backward GVC participation and the forward GVC participation.

As for the financial development, following Hassan et al. (2011), it is measured using domestic credit to the private sector as a percentage of GDP. This measurement is extracted from the World Development Indicators (WDI) dataset from the World Bank, and it measures the domestic credit to private sector as a percentage of GDP. It shows the financial resources such as loans, purchases of nonequity securities, and trade credits and other accounts receivable, establishing a claim for repayment, which are provided to the private sector by financial corporations.

Concerning the trade barriers, two measurements are extracted from the Economic Freedom Index provided by the Fraser Institute. The first measurement focuses on tariffs, which takes into account three aspects, the first aspect is revenues from trade taxes as a percentage of trade sector, which measures the amount of tax on international trade as a share of exports and imports. This aspect is extracted from the International Monetary Fund, International Financial Statistics. The second aspect is the unweighted mean of tariff rates,

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<sup>2</sup> Casella, B., Bolwijn, R., Moran, D. and Kanemoto K. (2019). "Improving the analysis of global value chains: the UNCTAD-Eora Database". *Transnational Corporations* 26(3). New York and Geneva: United Nations. Available at: <https://worldmrio.com/unctadgvc/>

and the third aspect is the standard deviation of tariff rates, which captures the variations in tariff rates. These two aspects are extracted from World Trade Organization, World Tariff Profiles.

It is worth mentioning that all the aspects measure economic freedom; revenue from trade taxes gives lower rates when the average tax rate on international trade increases, and mean tariff rate gives the highest rating to countries that do not impose tariffs, while the standard deviation of tariff rates gives higher rates to countries with low variations in their tariff rates. However, the aim of this paper is to capture the trade barriers therefore, the inverse of freedom indices is taken in order to capture the restrictiveness (Cheng et al., 2015).

The second measurement focuses on regulatory trade barriers which captures two aspects namely non-tariff trade barriers which is extracted from the Global Competitiveness Report's survey question that shows the country's opinion on whether tariff and non-tariff barriers significantly reduce the ability of imported goods to compete in the domestic market. This aspect is extracted from World Economic Forum, Global Competitiveness Report. The second aspect shows the compliance costs of importing and exporting, it captures the time and cost of procedures required to import a full 20-foot container of dry goods that contains no hazardous or military items. This aspect is extracted from the World Bank, Doing Business Indicators.

Similarly, the inverse of this measurement is considered in order to measure the restrictiveness.

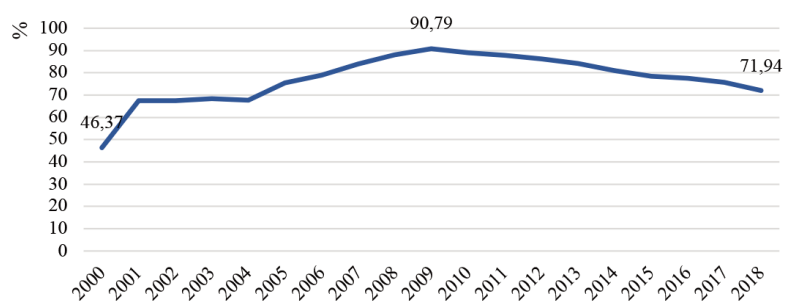
## STYLIZED FACTS

This part describes financial development, trade barriers and the levels of countries participation in GVCs for the 35 countries of the EU-Med region during the period between 2000 and 2018.

### Countries financial development level

The level of financial development provided by EU-Med governments to private sector particularly through domestic credit, has seen substantial growth from 2000 to 2018 as illustrated in Figure 1. Domestic credit as a percentage of GDP has increased from 46% to approximately 72% over this period. This growth reflects a shift towards policies that promote private sector development by improving access to financing and credit. These measures aim to enhance productivity and facilitate entry into export markets.

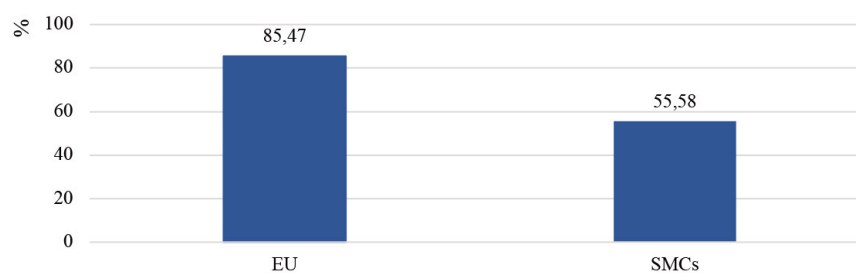
**Figure 1.** Average of domestic credit to private sector between 2000 and 2018 (% of GDP)



Source: calculated by the author using data from WDI-WB

Figure 2 highlights a striking difference in the provision of domestic credit to the private sector, with EU countries offering over 50% more credit compared to SMCs. This discrepancy is largely attributed to the advanced stage of financial development in EU countries, which have historically prioritized enhancing the credit environment for the private sector, in contrast to SMCs which have only recently embarked on significant financial reforms aimed at improving credit availability. For example, in Europe, a variety of well-established financial instruments support Small and Medium-sized Enterprises (SMEs) through various financial instruments including bank loans, crowdfunding and venture capital (EC, 2019). In comparison, SMCs have been gradually improving their financial infrastructure, for instance, Egypt has recently introduced measures under its National Structural Reforms Program to enhance credit facilities and financial resources for the private sector. These reforms particularly target the manufacturing sector and smaller enterprises, reflecting a growing commitment to promoting economic development through better financial support (OECD, UN and UNIDO, 2021).

**Figure 2.** Average of domestic credit to private sector by region (% of GDP)

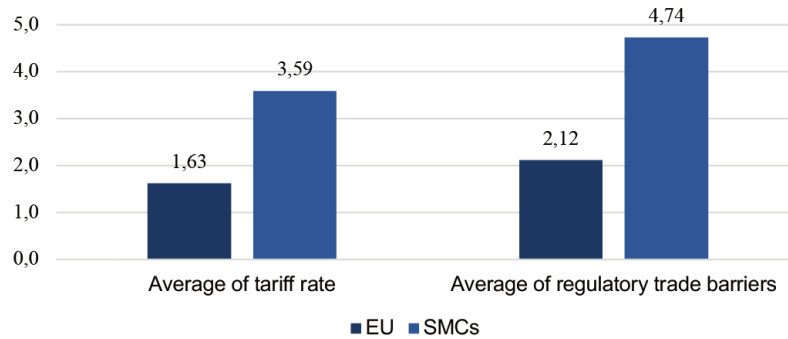


Source: calculated by the author using data from WDI-WB

### Trade barriers

Figure 3 compares average of tariff rates to average of regulatory trade barriers. It is evident that EU-Med countries tend to impose regulatory trade barriers more than tariffs in order to regulate trade movements, and to protect public health and environment by ways of imposing some criteria that may improve the products imported in the country, rather than imposing tariffs. Moreover, it is evident that SMCs impose higher tariffs and regulatory trade barriers than EU countries because they are more inclined to use trade barriers as a source of raising revenues while regulating international trade with other countries.

**Figure 3.** Average of trade barriers by region

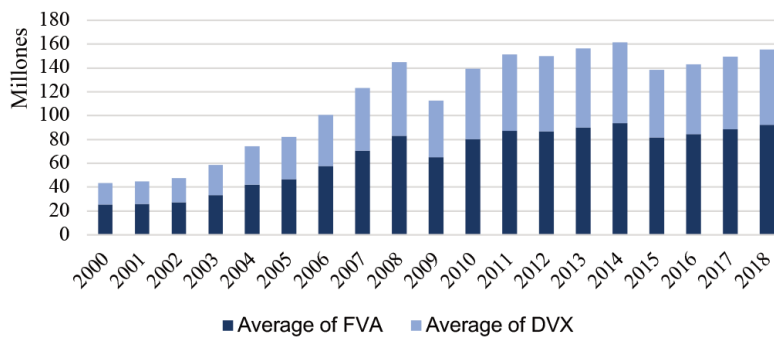


Source: calculated by the author using Economic Freedom Index provided by the Fraser Institute

**Countries participation in GVC**

Figure 4 demonstrates that EU-Med countries experience a rising trend in overall participation in GVCs, as measured by the sum of forward and backward linkages from 2000 to 2018. Notably, both forward and backward GVC linkage have shown individual increases over this period. This growth in both dimensions is essential for achieving greater export diversification and fostering more inclusive and sustainable development (OECD, 2018).

**Figure 4.** Average of forward and backward GVC between 2000 and 2018

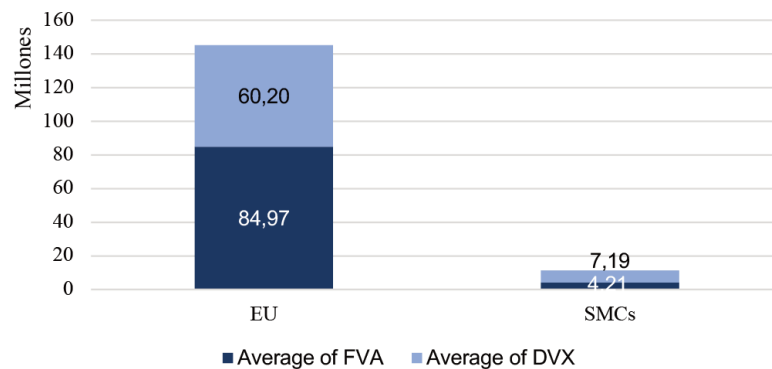


Source: calculated by the author using UNCTAD-Eora GVC database

Figure 5 compares forward and backward linkages between EU countries and SMCs. It shows that GVC participation in EU countries is more than twelve times greater than those in SMCs. This disparity reflects the advanced production system, and cutting-edge technologies prevalent in EU countries, which benefit from sophisticated production techniques and have strong regional integration (Jones et al., 2019). Consequently, EU production processes are among the most fragmented globally (WDR, 2020), emphasizing high-tech and capital-intensive goods that add substantial value and are positioned in downstream stages (Ahmed, 2010). Accordingly, EU countries exhibit a higher share of backward linkages compared to forward linkages, whereas the opposite is true for SMCs. This difference is

attributable to SMCs specialization in primary and commodity goods, which are concentrated in upstream stages with low value-added. Conversely, EU countries are less involved in supplying intermediate inputs, as they specialize more in producing end products.

**Figure 5.** Average of forward and backward GVC by region

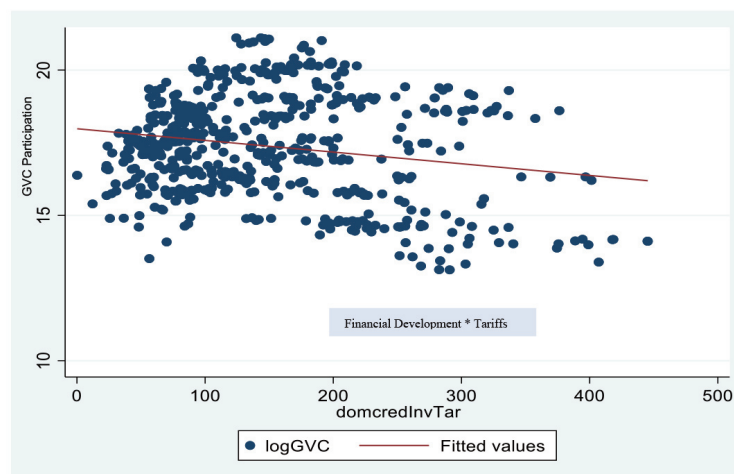


Source: calculated by the author using UNCTAD-Eora GVC database

**The relationship between financial development, trade barriers and GVC participation**

Figure 6 highlights the trend showing the interplay between financial development and tariffs on GVC participation. The abscissa axis represents the interaction between the provision of domestic credit to private sector and tariffs, while the ordinate axis shows GVC participation. The figure aims to descriptively determine whether the positive effect of financial development, or the negative effect of tariffs will dominate in shaping GVC participation. To this end, the trend shows a negative relationship, meaning that countries imposing high tariffs and providing credit to private sector are less likely to engage in GVCs.

**Figure 6.** The relationship between financial development, tariffs and GVC participation

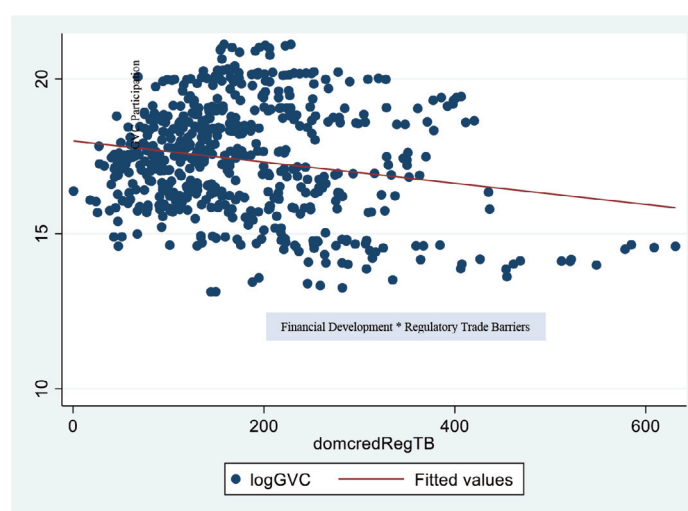


Source: calculated by the author using UNCTAD-Eora GVC database, WDI-WB and Economic Freedom Index provided by the Fraser Institute



Similarly, figure 7 illustrates the interaction between financial development and regulatory trade barriers on GVC participation. The abscissa axis represents the combined effect of domestic credit provision to the private sector and regulatory trade barriers, while the ordinate axis displays GVC participation. The purpose of the figure is to descriptively evaluate whether the positive influence of financial development or the negative impact of regulatory trade barriers is more prevailing in determining GVC participation. The observed trend indicates a negative relationship, suggesting that countries with high regulatory trade barriers and substantial credit to the private sector are less likely to participate in GVCs.

**Figure 7.** The relationship between financial development, regulatory trade barriers and GVC participation



Source: calculated by the author using UNCTAD-Eora GVC database, WDI-WB and Economic Freedom Index provided by the Fraser Institute

## METHODOLOGY

In order to estimate the effect of financial development and trade barriers on GVC participation, this paper uses Extended Regression Model (ERM). This model has several benefits that allow deriving consistent and unbiased estimators. First, it has the advantage of accounting for the endogeneity problem of financial development and its reverse causality with GVC participation, in addition to the endogeneity problem of trade barriers and its reverse causality with GVC participation by allowing the use of instrumental variables. Second, ERM can include more than one endogenous variable which are financial development and trade barriers. Third, it handles the use of endogenous covariates in interaction.

Firstly, the model estimates the effect of financial development on GVC participation

$$Y_{i,t} = \beta_0 + \beta_1 FD_{i,t} + \beta_2 X_{i,t} + \delta_i + \delta_t + \varepsilon_{i,t} \quad (1)$$

Secondly, the model estimates the effect of trade barriers on GVC participation

$$Y_{i,t} = \theta_0 + \theta_1 TB_{i,t} + \theta_2 X_{i,t} + \delta_i + \delta_t + \mu_{i,t} \quad (2)$$

Finally, the model estimates the effect of interaction between the provision of financial development and the impositions of tariffs and non-tariff measures on GVC participation as follows:

$$Y_{i,t} = \lambda_0 + \lambda_1 FD_{i,t} + \lambda_2 TB_{i,t} + \lambda_3 FD_{i,t} * TB_{i,t} + \lambda_4 X_{i,t} + \delta_i + \delta_t + u_{i,t} \quad (3)$$

with  $i$  and  $t$  representing country and time respectively.

$Y_{i,t}$  is GVC participation which is measured by three measurements namely Foreign Value Added (FVA) embodied in the country's exports or backward GVC, domestic value added embodied in other countries' exports or forward GVC (DVX), and GVC participation index for the country which encompass backward and forward GVC.

$FD_{i,t}$  is the level of financial development which is proxied by the domestic credit to private sector as a percentage of GDP. This proxy is widely used in the literature because it measures the country's financial depth and it captures the difference in the level and the quality of financial systems across countries (Levine, 2005; Hassan, 2011; Kiendrebeogo, 2012). Financial systems that ease credit provisions to private sectors are developed because the system monitors the research of the creditors, supervises their risk management, transactions and savings (Levine 2005). Accordingly, a good business regulation is associated with a robust credit market which allows businesses and individuals to access loans and credit instruments.

According to the literature, estimating the effect of financial facilitation on GVC participation led to reverse causality problem. Thus,  $Z_{i,t}$  is the vector of instruments employed to solve the endogeneity problem. The vector represents firstly the legal origin which is proved to be relevant as it is highly correlated to financial development, and it is exogenous, since it only affects GVC participation through financial facilitation (Manova, 2013). Legal origin has often been used as set of dummy variables (Levine et al., 2000; Aghion et al., 2005), accordingly,  $Z_{i,t}$  is a dummy variable taking the value 1 if the legal tradition of the country follows French Civil Law, and it takes the value 0 if the country follows English Common Law, German Civil Law, Socialist Law or Scandinavian Law. This data is obtained from the legal origin data published by LaPorta et al. (2008). The legal origin of the country has been proven to materially influence the legal treatment of creditors and shareholders, the country's accounting standards, and the efficiency of contract enforcement. Accordingly, this will affect the efficiency of financial intermediaries and markets without having a direct effect on GVC participation.

Secondly, another instrument is used measuring business regulations which is extracted from Economic Freedom Index provided by Fraser Institute. It takes into consideration six aspects, the first is extracted from the Global Competitiveness Report's survey question that shows the country's opinion on the extent to which complying with administrative requirements is burdensome. The second aspect is bureaucracy costs, which is extracted from the "Regulatory Burden Risk Ratings" from IHS Markit. It measures the risk that normal business operations become costlier due to the regulatory environment such as regulatory compliance and bureaucratic inefficiency and opacity. The third aspect captures the nepotism, cronyism, and discrimination of the country in the application of public administration, and it is extracted from V-Dem database. The fourth, fifth and sixth aspects are extracted from Doing Business database, measuring the time, cost and capital requirements needed to start a business, and the time and monetary costs required to obtain a license to construct a standard warehouse, and the time required for a business to prepare, file, and pay taxes on corporate income, value added or sales taxes, and taxes on labor.

This instrument is valid because it affects the country's financial development without directly affecting the country's participation in GVCs. Countries with good quality business regulation tend to support the development of credit market and are associated with an increase in the domestic credit to the private sector and financial development (Mallinguh and Zoltan, 2018; Yakubi et al., 2022).

Moreover, these instruments are proved to be valid as shown in Table A1 in Appendix which demonstrates that they are exogenous and over-identified for the three definitions of GVC participation.  $TB_{i,t}$  are trade barriers which are measured by two measurements, namely tariff and regulatory trade barriers.

According to the literature, estimating the effect of trade barriers on GVC participation lead to reverse causality problem. Thus,  $W_{i,t}$  is the vector of instruments employed to solve the endogeneity problem. The vector represents firstly inflation rate, represented as annual percentage of GDP deflator. Inflation rate is proven to affect trade barriers such as tariff and non-tariff barriers; it can have two effects on trade

barriers, firstly, high inflation rate may result in consumers suffering from high prices and discouraging the frequency of using trade barriers in order to reduce inflation rate (Zhang et al., 2020). Secondly, a high inflation rate may result in more imports, therefore, the government will resort to increase trade barriers in order to increase the level of protection in the country and to prevent additional inflation waves (Bohara and Kaempfer, 1991). Moreover, inflation rate does not directly affect GVC participation, however, it affects it only through trade barriers.

Another instrument is measured using regulatory quality which takes into consideration the policies and regulations promoting private sector's development. This instrument is directly related to trade barriers because an efficient regulation must be transparent, non-discriminatory and it must avoid unnecessary trade restrictiveness. In this context, countries adopt regulatory reforms aiming to reduce trade barriers such as de-bureaucratization reform (OECD, 2005). Consequently, countries with better regulatory quality are more liberalized and impose lower tariff and non-tariff trade barriers (OECD, 2005; Barbero et al., 2021) without directly affecting GVC participation.

Furthermore, these instruments are proved to be valid because they satisfy the exclusion restriction assumption since they are not directly affecting GVC participation, but they affect it only through trade barriers. Moreover, Table A2 and A3 in Appendix demonstrates that the instruments are exogenous and over-identified for the three definitions of GVC participation.

$X_{i,t}$  is a vector of control variables including GDP in constant prices, net investments in non-financial assets, government expenditure on education as a percentage of GDP in order to measure human capital trade as a percentage of GDP and the percentage of individuals using internet from total population in order to measure the quality of infrastructure. These data are extracted from WDI dataset provided by the WB. In addition to political stability which is extracted from World Governance Indicators (WGI) dataset provided by the WB.

$\delta_j$ ,  $\delta_t$  are country and year fixed effect.

## EMPIRICAL FINDINGS

This section highlights in the first part the results of the individual effects of financial development on GVC participation, followed by the individual effects of trade barriers on GVC participation in the second part, then the interaction between both variables and their effect on GVC participation in the third part.

### THE EFFECT OF FINANCIAL DEVELOPMENT ON GVC PARTICIPATION

The relationship between financial development and GVC participation is examined using ERM as shown in Table 1. The results of ERM prove the endogeneity of financial development since the correlation between unobserved factors affecting the three definitions of GVC participation and those affecting financial development are not equal to zero as shown in columns 1, 2 and 3. Furthermore, the negative sign of the coefficient proves that the unobserved characteristics increasing financial development, tend to decrease GVC participation.

After addressing endogeneity problem, the coefficients of the effect of domestic credit to private sector are positive and significant across all three definitions of GVC participation. This indicates that countries where private sectors have better access to financial resources such as loans, trade credits and nonequity securities are more likely to engage in backward GVCs and be close to the final demand and end consumers. They also show increased involvement in forward linkages, and overall GVC participation. This finding aligns with the literature, proving that a well-developed financial system enhances a country's comparative advantage, competitiveness, specialization gains, and reduces costs of capital, thereby boosting enhances international trade (Caporale et al., 2022). This leads to a higher integration in GVCs.

The coefficients prove that countries increasing domestic credits to private sectors by 1% engage more in backward GVCs by around 0.17%. This suggests that domestic credit to private sectors allows countries to engage more in upstream stages, import foreign inputs and produce high value-added goods and services that are closer to end consumers and to final demand (Antras, 2019). Similarly, increased domestic credit facilitates forward GVC participation, allowing countries to export low value-added inputs, such as raw materials, with a corresponding increase of approximately 0.22%. Likewise, the increase in domestic credit increases their GVC participation, considering both forward and backward linkages by 0.21%.

Moreover, differentiating the effect of credit provision to private sector on forward and backward GVC participation, the results indicate that credit provision has a more pronounced effect on forward GVC activities. This can be attributed to several factors such that forward GVC activities are primary activities that require quality improvement, technological upgrade and significant investment in capacity building in order to be able to develop and compete with international products. Therefore, increased credit

supports production diversification, and compliance with industry standards and regulations, allowing GVC participants to scale up operations and integrate more into downstream production processes.

The effect of domestic credit to private sector on GVC participation remains robust to the inclusion of the set of covariates. Investment positively impacts all the definitions of GVC participation, suggesting that countries with a stable investment environment are more induced to participate in GVCs (Mitra et al., 2019). GDP has also a significant positive effect on all the definitions of GVC participation, as higher GDP levels indicate a favorable investment climate and a greater likelihood of GVC participation. Investment is found to boost GVC participation by between 1.6% and 8.7%. Conversely, government expenditure on education shows a negative and insignificant effect, indicating that increased spending on education does not necessarily lead to fostering the knowledge, experience and skills that are needed for economic upgrading and GVC participation. This result is counterintuitive, since higher government spending on education is generally expected to improve GVC participation (Obasaju et al., 2021; Lwesya, 2022). Additionally, greater internet usage is associated with increased GVC participation, suggesting that interconnected countries are more likely to participate in GVCs (Lwesya, 2022).

**Table 1.** The effect of domestic credit on GVC participation

	Extended Regression Model		
	(1) LogFVA	(2) LogDVX	(3) LogGVC
<b>Log GDP constant</b>	0.258*** (0.0572)	0.611*** (0.0589)	0.409*** (0.0535)
<b>Ln Investment</b>	0.0868*** (0.0115)	0.0157 (0.0118)	0.0533*** (0.0108)
<b>Education Expenditure</b>	-0.0039 (0.0033)	-0.0017 (0.0034)	-0.0025 (0.0031)
<b>Internet usage</b>	0.0002 (0.0007)	0.0021*** (0.0007)	0.0009 (0.0006)
<b>Domestic Credit</b>	0.0017** (0.0007)	0.0022** (0.0009)	0.0021*** (0.0008)
<b>Constant</b>	5.681*** (1.282)	-1.329 (1.319)	3.426*** (1.199)
<b>corr(e.credit,e.logFVA)</b>	-0.667*** (0.177)		
<b>corr(e.credit,e.logDVX)</b>		-0.829*** (0.0888)	
<b>corr(e.credit,e.logGVC)</b>			-0.825*** (0.0912)
<b>Observations</b>	416	416	416

Notes: (i) Each column represents an individual regression, (ii) Standard errors in parentheses, (iii) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1, (iv) All regressions include country and year fixed effects.

## THE EFFECT OF TRADE BARRIERS ON GVC PARTICIPATION

In order to estimate the effect of trade barriers on GVC participation, two measurements of trade barriers are taken into consideration. The first measurement is the tariff rate, and the second measurement is the regulatory trade barriers imposed by the country. The results of both measurements are presented in Table 2. The results in all columns of Table 2 indicate the presence of endogeneity, as the correlation between the errors associated with the two definitions of trade barriers and GVC participation is positive and significant. This means that unobserved characteristics increasing trade barriers also tend to increase GVC participation.

The coefficients of both types of trade barriers are negative and statistically significant across all definitions of GVC participation. This implies that higher trade barriers imposed by governments, regardless of their type, generally reduce the country's participation in GVCs. This aligns with existing literature proving that tariffs and other trade impediments hampers GVC participation because in GVCs involve the fragmentation of products across multiple stages and locations. Accordingly, intermediate inputs often cross different borders several times, leading to repeated imposition of tariffs and non-tariff measures (Korwatanasakul and Baek, 2021).

As for the effect of tariff barriers on GVC participation, it is evident that an increase in tariff rates by 1% decreases backward GVC participation by around 14.4%. This suggests that higher tariffs discourage countries from importing value-added products that will be later reused in exports. Similarly, a 1% rise in tariff rate by decreases forward GVC participation by 10.6%, meaning that higher tariffs tend to reduce a country's exports of intermediate goods. Comparing forward and backward linkages, it is evident that the negative effect of tariffs on GVC participation is more severe on backward GVC participation compared to forward GVC participation. Accordingly, the negative effect on imports of tariff imposer is greater than the carry-forward effect on the exports of tariff imposer (Cheng et al., 2015). Finally, the effect of tariffs on the overall measurement of GVC participation shows that an increase in tariffs by 1%, decreases GVC participation measured by forward and backward linkages by 12.1%. This result is due to the combined adverse effects of tariffs on both backward and forward linkages.

In contrast, regulatory trade barriers, while also negatively impacting GVC participation, do so to a lesser extent than tariffs. In this context, a 1% increase in regulatory trade barriers decreases backward GVC participation by 11.3%, indicating that countries imposing tariffs are less incentivized to import intermediate and capital goods as they will be more expensive, so they are costlier in being used as an intermediate good for their exports to other countries (Ghodsi and Stehrer, 2022). Similarly, regulatory barriers reduce forward GVC participation by 8.2%, and resulting in an overall reduction of GVC participation by 9.2%.

The less severe effect of regulatory trade barriers compared to tariffs is attributed to the fact that tariffs impose immediate and direct costs on imports, making affected products more expensive instantly, whereas regulatory trade barriers can have both trade-enhancing and trade-hampering effects (Ghodsi and Stehrer, 2022).

**Table 2.** The effect of trade barriers on GVC participation

	Extended Regression Model			Extended Regression Model		
	<i>Tariff barriers</i>			<i>Regulatory trade barriers</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
	LogFVA	LogDVX	LogGVC	LogFVA	LogDVX	LogGVC
Log GDP constant	0.200*** (0.0553)	0.485*** (0.0535)	0.321*** (0.0504)	0.241*** (0.0541)	0.512*** (0.0536)	0.360*** (0.0498)
Ln Investment	0.0729*** (0.01)	0.0228** (0.0098)	0.0532*** (0.0092)	0.0743*** (0.0099)	0.0241** (0.0097)	0.0545*** (0.0090)
Education Expenditure	-0.0127*** (0.0027)	-0.0033 (0.0027)	-0.008*** (0.0025)	-0.0136*** (0.0027)	-0.0039 (0.0027)	-0.0087*** (0.0025)
Internet usage	0.0014** (0.0007)	0.0029*** (0.0007)	0.002*** (0.0006)	0.0015** (0.0007)	0.0029*** (0.0007)	0.0021* (0.0006)
Trade barriers	-0.144*** (0.0258)	-0.106*** (0.0237)	-0.121*** (0.0230)	-0.113*** (0.0225)	-0.0823*** (0.0223)	-0.0928*** (0.0208)
Constant	8.227*** (1.328)	2.167* (1.280)	6.288*** (1.209)	7.154*** (1.306)	1.437 (1.294)	5.255*** (1.202)
corr(e.TB,e.logFVA)	0.683*** (0.0889)			0.507*** (0.132)		
corr(e.TB,e.logDVX)	0.590*** (0.114)			0.395*** (0.159)		
corr(e.TB,e.logGVC)	0.641*** (0.102)			0.443*** (0.148)		
Observations	446	446	446	446	446	446

Notes: (i) Each column represents an individual regression, (ii) Standard errors in parentheses, (iii) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1, (iv) All regressions include country and year fixed effects.

## THE EFFECT OF FINANCIAL DEVELOPMENT AND TRADE BARRIERS ON GVC PARTICIPATION

This part highlights the effect on GVC participation of the interaction between domestic credit to private sector, which is the measurement used to estimate financial development and trade barriers using both definitions namely tariff barriers and regulatory trade barriers. Table 3 shows the result of the interaction using ERM accounting for reverse causality between financial development and GVC participation, as well as between trade barriers and GVC participation.

The findings indicate that the coefficient of credit to private sector is positive and significant, while the coefficient of trade barriers, whether tariff barriers or regulatory trade barriers is negative and significant. This aligns with previous findings of individual effects presented in Table 1 and Table 2 and aligns with the literature proving that financially developed countries, giving domestic credits to private sectors are more competitive and are more likely to engage in international trade, and participate in GVCs, in addition to the literature



proving that countries imposing high tariff and regulatory trade barriers are less likely to participate in GVCs. The results show that the inclusion of domestic credit to private sector and the interaction term has alleviated the negative effect of tariffs and regulatory trade barriers on GVC participation, such that the imposition of trade barriers decreases GVC participation by between around 6.6% and 13%, and that this effect has been alleviated more for the imposition of tariffs compared to regulatory trade barriers.

As for the interaction between domestic credit to private sector and trade barriers, whether tariffs or regulatory trade barriers, the coefficient proves that countries providing domestic credit to private sectors but imposing high tariff and regulatory trade barriers are less likely to participate in GVCs. However, the positive influence of financial development only partially offsets the negative impact of trade barriers. Nevertheless, it shows that the encouragement of financial development and the provision of domestic credit to private sectors is a successful policy that decreases the intensity of the negative effect of trade barriers on GVC participation.

The provision of domestic credit to private sector is more effective in reducing the negative effect of trade barriers on forward GVC participation because the individual effects showed that the positive individual effect of financial development was more pronounced on forward GVC participation, and that the negative individual effect of trade barriers, whether tariffs or regulatory trade barriers, is stronger on backward GVC participation. Accordingly, the combined effect of financial development is more effective in reducing the negative effect of trade barriers on forward GVC participation, and therefore countries will be more encouraged to export inputs and intermediate goods with low value added, such as commodity goods and raw materials.

The coefficient shows that countries providing credit to private sectors and imposing trade barriers are less likely to participate in GVCs by 0.08%. The results indicate that the provision of credit is more effective in mitigating the negative effect of regulatory trade barriers on GVC participation than tariffs. As illustrated in column 4, 5 and 6 of Table 3, regulatory trade barriers cut forward GVC participation by around 6.6%, however, with the provision of domestic credit, this reduction is limited to 0.04%. Nevertheless, tariffs reduce forward GVC participation by 7.9%, while the provision of domestic credit reduces this effect to 0.12%. Thus, the policy is more effective against regulatory trade barriers compared to tariff barriers.

**Table 3.** The effect of domestic credit and trade barriers on GVC participation

	Extended Regression Model			Extended Regression Model		
	<i>Tariff barriers</i>			<i>Regulatory trade barriers</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
	LogFVA	LogDVX	LogGVC	LogFVA	LogDVX	LogGVC
<b>Log GDP constant</b>	0.0634 (0.0548)	0.375*** (0.0581)	0.191*** (0.0505)	0.204*** (0.0576)	0.509*** (0.0604)	0.343*** (0.0536)
<b>Ln Investment</b>	0.0520*** (0.0092)	-0.00192 (0.0097)	0.0258*** (0.0084)	0.0660*** (0.0093)	0.00914 (0.0099)	0.0386*** (0.0087)
<b>Education Expenditure</b>	-0.0232*** (0.0073)	-0.0234*** (0.0077)	-0.0225*** (0.0067)	-0.0135* (0.0075)	-0.0153* (0.008)	-0.0131* (0.007)
<b>Internet usage</b>	-0.0006 (0.0006)	0.0017*** (0.0006)	0.0002 (0.0006)	0.0002 (0.0006)	0.0024*** (0.0007)	0.001* (0.0006)
<b>Trade barriers</b>	-0.131*** (0.0220)	-0.0788*** (0.0238)	-0.0994*** (0.0206)	-0.0783*** (0.0234)	-0.0666*** (0.0238)	-0.0662*** (0.0216)
<b>Credit</b>	0.0017** (0.0007)	0.0033*** (0.0008)	0.0028*** (0.0007)	0.0021*** (0.0008)	0.0034*** (0.001)	0.003*** (0.0009)
<b>Credit*TB</b>	-0.0003 (0.0003)	-0.0012*** (0.0003)	-0.0008*** (0.0002)	-0.0001 (0.0001)	-0.0004** (0.0002)	-0.0002 (0.0001)
<b>Constant</b>	11.68*** (1.319)	5.299*** (1.399)	9.839*** (1.216)	7.626*** (1.396)	1.572 (1.462)	5.554*** (1.300)
<b>Observations</b>	402	402	402	402	402	402

Notes: (i) Each column represents an individual regression, (ii) Standard errors in parentheses, (iii) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1, (iv) All regressions include country and year fixed effects

## ROBUSTNESS CHECKS

Other measurements of the variables of interest are used to verify whether the results of the interaction of financial development measured by domestic credit to private sector and trade barriers on GVC participation still hold. Firstly, two additional measurements of GVC participation are employed; the first measurement considers Domestic Value Added (DVA) embodied in the country's exports, and the second measurement takes into consideration the Total Value Added (TVA) embodied in this country's exports, which is the sum of DVA and FVA.

Table 4 shows that the same results of Table 3 are consistent when testing the effect of domestic credit to private sector and trade barriers using its two measurements namely tariff barriers and regulatory trade barriers, and their interaction on GVC participation using the two measurements namely DVA and TVA.

It is worth mentioning that endogeneity problem has been solved by employing the same instruments used with the other definitions of GVC participation as detailed in Table A1, A2 and A3 in Appendix. The coefficients reveal that with tariff barriers, a 1% increase in domestic credit raises DVA embodied in the country's own exports by 0.47%, and that the increase in domestic credit increases the total value added embodied in countries' exports by around 0.37%. However, with regulatory trade barriers, the increase in domestic credit by 1% increases DVA by only 0.22% and increases TVA by around 0.24%. This indicates that tariff barriers have a more pronounced negative effect on GVC participation than regulatory trade barriers.

The interaction results remain consistent with Table 3, showing that the provision of credit has a more favorable effect on GVC participation in the presence of regulatory trade barriers compared to tariffs. Nonetheless, providing credit while imposing both types of trade barriers negatively affects GVC participation.

**Table 4.** The effect of domestic credit and trade barriers on Domestic and total value added GVC participation

	Extended Regression Model		Extended Regression Model	
	<i>Tariff barriers</i>		<i>Regulatory trade barriers</i>	
	(1)	(2)	(3)	(4)
	LogDVA	LogVA	LogDVA	LogVA
<b>Log GDP constant</b>	0.417*** (0.0573)	0.286*** (0.0504)	0.546*** (0.0598)	0.419*** (0.0528)
<b>Ln Investment</b>	0.0097 (0.0095)	0.0247*** (0.0084)	0.0200** (0.0098)	0.0360*** (0.0087)
<b>Education Expenditure</b>	-0.0275*** (0.0076)	-0.0250*** (0.0067)	-0.0197** (0.0079)	-0.0168** (0.007)
<b>Internet usage</b>	0.001 (0.0006)	0.0007 (0.0006)	0.0017*** (0.0007)	0.0014** (0.0006)
<b>Trade barriers</b>	-0.0697*** (0.0235)	-0.0862*** (0.0208)	-0.0669*** (0.0235)	-0.0665*** (0.0209)
<b>Credit</b>	0.0047*** (0.0009)	0.0037*** (0.0008)	0.0046*** (0.001)	0.0039*** (0.001)
<b>Credit*TB</b>	-0.0014*** (0.0003)	-0.0011*** (0.0002)	-0.0004** (0.0002)	-0.0003** (0.0001)
<b>Constant</b>	4.964*** (1.381)	8.113*** (1.215)	1.374 (1.448)	4.386*** (1.279)
<b>Observations</b>	402	402	402	402

Notes: (i) Each column represents an individual regression, (ii) Standard errors in parentheses, (iii) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1, (iv) All regressions include country and year fixed effects.

Secondly, another measurement of financial development is employed which is financial institutions depth index provided by the International Monetary Fund (IMF). The index developed by the IMF takes into account the complex multidimensional nature of financial development (Sahay et al., 2015). This index considers the level of depth of the financial institutions (banking and non-banking) by taking into account the size and liquidity of markets. Financial institutions depth takes into consideration the size of life and non-life insurance premiums, and the assets of the mutual fund and pension fund industries. Table 5 presents the results of the individual effect of this measurement, the individual effect of trade barriers and their interaction on the five definitions of GVC participation namely FVA embodied in the country's exports or backward GVC, DVA embodied in the country's exports, DVX embodied in other countries' exports or forward GVC, TVA embodied in the country's exports and GVC participation index for the country which encompass the backward and forward GVC.

The results are in line with Table 3, demonstrating that financial development encourages GVC participation and that trade barriers decreases it, and that their interaction has a negative effect on GVC

participation. It is worth mentioning that this measurement of financial development highlights the positive effect on GVC participation more than domestic credit to private sector, but it is less effective at mitigating the negative effect of trade barriers on GVC participation.

**Table 5.** The effect of financial development and trade barriers on GVC participation

	Extended Regression Model					Extended Regression Model				
	<i>Tariffs</i>					<i>Regulatory trade barriers</i>				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	LogFVA	LogDVX	LogGVC	LogDVA	LogVA	LogFVA	LogDVX	LogGVC	LogDVA	LogVA
<b>Log GDP constant</b>	0.152***	0.395***	0.252***	0.410***	0.328***	0.251***	0.463***	0.340***	0.459***	0.390***
(0.0536)	(0.0505)	(0.0464)	(0.052)	(0.0469)	(0.0546)	(0.0524)	(0.0483)	(0.0538)	(0.0484)	
<b>Ln Investment</b>	0.0540***	0.00420	0.0306***	0.0196**	0.0321***	0.0678***	0.0165*	0.0444***	0.0319***	0.0450***
	(0.00974)	(0.00916)	(0.00841)	(0.0094)	(0.0085)	(0.0099)	(0.0095)	(0.0088)	(0.0098)	(0.0088)
<b>Education Expenditure</b>	-0.0241***	-0.0237***	-0.0251***	-0.0259***	-0.0262***	-0.0098	-0.0126	-0.0120*	-0.0153*	-0.0146**
	(0.0078)	(0.0074)	(0.0068)	(0.0076)	(0.0068)	(0.008)	(0.0077)	(0.00711)	(0.0079)	(0.0071)
<b>Internet usage</b>	0.0008	0.0021***	0.0013**	0.0018***	0.0017***	0.0014**	0.0026***	0.0018***	0.0022***	0.0021***(0.0007)
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0007)	(0.0006)	(0.0006)	(0.0007)	(0.0006)	
<b>Trade barriers</b>	-0.0576**	-0.0332	-0.0357*	-0.0219	-0.0250	-0.0878***	-0.0888***	-0.0839***	-0.0937***	-0.0870***
	(0.0230)	(0.0217)	(0.0201)	(0.0226)	(0.0203)	(0.0222)	(0.0213)	(0.0197)	(0.0219)	(0.0198)
<b>Financial Development</b>	0.266*	0.410***	0.374***	0.644***	0.526***	0.410***	0.379**	0.432***	0.557***	0.517***
	(0.153)	(0.145)	(0.130)	(0.164)	(0.137)	(0.141)	(0.149)	(0.133)	(0.166)	(0.143)
<b>FD*TB</b>	-0.290***	-0.300***	-0.322***	-0.323***	-0.323***	-0.135***	-0.0924***	-0.125***	-0.103***	-0.124***
	(0.0410)	(0.0386)	(0.0354)	(0.0396)	(0.0358)	(0.0296)	(0.0285)	(0.0263)	(0.0292)	(0.0263)
<b>Constant</b>	9.392***	4.508***	8.109***	4.723***	6.773***	6.618***	2.678**	5.683***	3.396***	5.095***
	(1.285)	(1.209)	(1.113)	(1.247)	(1.124)	(1.303)	(1.252)	(1.154)	(1.285)	(1.156)
<b>Observations</b>	437	437	437	437	437	437	437	437	437	437

Notes: (i) Each column represents an individual regression, (ii) Standard errors in parentheses, (iii) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1, (iv) All regressions include country and year fixed effects  
Conclusion and policy recommendations

## CONCLUSION AND POLICY RECOMMENDATIONS

This paper examines the effect of financial development, trade barriers and GVC participation in EU-Med countries during the period between 2000 and 2018 using ERM. It explores the individual effect of policies imposed by governments aiming at enhancing financial development and the depth of financial institutions on GVC participation, it also assesses the individual effect of the imposition of trade policies on GVC participation, in addition to the effect of interacting both policies on GVC participation. Further, it differentiates between the effect of the two policies on forward and backward GVC participation.

The empirical results of the paper prove that governments that are financially developed and provide various types of credit to private sector engage more in GVCs. Specifically, governments' policy improving the country's level of financial development, and providing credits in the form of loans and trade credits to private sector are more effective in reinforcing the country's participation in forward linkages compared to backward ones. Nevertheless, GVC participation is adversely affected by increased trade barriers. High tariffs and regulatory trade barriers raise the cost of imported inputs that will be re-used in the production, impeding both forward and backward GVC participation. The adverse impact of trade barriers is more pronounced in backward GVC participation due to the complex and technologically intensive nature of downstream production, which often involves multiple borders crossing, and imposition of trade barriers several times. Moreover, the empirical results show that tariffs have a more detrimental effect on GVC participation compared to regulatory trade barriers.

Furthermore, the results of the paper prove that governments' policy aiming at enhancing financial development in the country and providing credit to private sector is more effective in attenuating the negative effect of trade barriers on forward GVC participation, particularly when employing regulatory trade barriers compared to tariffs. Trade barriers disincentivize the country's exports from raw materials and commodity goods, accordingly, increasing credit to private sector can stimulate and enhance country's exports of these inputs.

In light of these findings, the primary policy recommendation emphasizes directing governments in the EU-Med region towards reducing trade barriers. This can be achieved by increasing EU-Med governments' engagement in bilateral and multilateral trade agreements in order to reduce or eliminate tariffs and regulatory trade barriers on exchanged products in several essential sectors such as agriculture sector, and to gradually reduce tariff and regulatory trade barriers on exchanged products in industrial sector. Such measures would create a safe harbor for businesses to engage in GVCs without increasing their burdens.

Furthermore, it is recommended that EU-Med governments facilitate access to credit to private sector. This policy not only improves GVC participation, but also effectively mitigates the negative effect of trade

barriers on forward GVC participation. Therefore, EU-Med governments should intensify their efforts to enhance credit access to private sector operating in specific industries. This can be achieved by several ways.

Firstly, EU-Med governments may intervene by using targeted incentive schemes to GVC participants engaging in new investment projects by providing them with a tax relief for a certain period of years, or a non-repayable financial contribution, or customs tax and duty exemptions and reductions. Further, governments may provide GVC participants with tax incentives such as tax credits which enables businesses engaging in GVCs to reduce the amount of the tax they owe to government. The tax incentive may also be targeting nascent participants in GVCs that are active in innovation, taking the form of R&D tax allowance or R&D tax credit incentives or deductions. Targeted schemes may also focus on providing training programmes to nascent GVC participation in order to support their development.

Secondly, EU-Med governments may encourage and provide financial assistance to financial corporations, enabling them to provide trade credit to nascent businesses engaging in GVCs which can increase their liquidity by allowing them to pay later. It will also enable financial corporations to provide businesses with loans with easier terms or reduce guarantee requirements.



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## APPENDIX: INSTRUMENTS TESTING

**Table A1.** Endogeneity test for credit to private sector – French Civil Law and cost and time of starting a business

	Under-identification test		Sargan statistic		Endogeneity test	
	H <sub>0</sub> : IV not correlated with GVC		H <sub>0</sub> : instruments are valid		H <sub>0</sub> : variables are exogenous	
	F-stat	P-value	F-stat	P-value	F-stat	P-value
<b>LogFVA</b>	12.583	0.0019	0.737	0.3908	14.002	0.0002
<b>LogDVX</b>	12.583	0.0019	0.817	0.3662	15.924	0.0001
<b>LogGVC</b>	12.583	0.0019	0.853	0.3557	16.008	0.0001
<b>LogDVA</b>	12.583	0.0019	0.938	0.3328	25.183	0.0000
<b>LogVA</b>	12.583	0.0019	0.865	0.3523	23.058	0.0000

**Table A2.** Endogeneity test for tariff – inflation rate and regulatory quality

	Under-identification test		Sargan statistic		Endogeneity test	
	H <sub>0</sub> : IV not correlated with GVC		H <sub>0</sub> : instruments are valid		H <sub>0</sub> : variables are exogenous	
	F-stat	P-value	F-stat	P-value	F-stat	P-value
<b>LogFVA</b>	198.091	0.0000	2.192	0.1387	32.530	0.0000
<b>LogDVX</b>	198.091	0.0000	0.186	0.6663	19.368	0.0000
<b>LogGVC</b>	198.091	0.0000	0.499	0.4800	28.293	0.0000
<b>LogDVA</b>	198.091	0.0000	1.047	0.3062	12.448	0.0004
<b>LogVA</b>	198.091	0.0000	0.003	0.9591	21.085	0.0000

**Table A3.** Endogeneity test for regulatory trade barriers – inflation rate and regulatory quality

	Under-identification test		Sargan statistic		Endogeneity test	
	H <sub>0</sub> : IV not correlated with GVC		H <sub>0</sub> : instruments are valid		H <sub>0</sub> : variables are exogenous	
	F-stat	P-value	F-stat	P-value	F-stat	P-value
<b>LogFVA</b>	172.494	0.0000	0.528	0.4675	37.524	0.0000
<b>LogDVX</b>	172.494	0.0000	3.843	0.0499	16.454	0.0000
<b>LogGVC</b>	172.494	0.0000	1.435	0.2310	27.452	0.0000
<b>LogDVA</b>	172.494	0.0000	4.446	0.0350	11.380	0.0007
<b>LogVA</b>	172.494	0.0000	2.192	0.1388	19.423	0.0000



CMCI · 2 rue Henri Barbusse · F-13 241 Marseille cedex 01 · France  
+ 33 (0) 4 91 31 51 95 · [www.femise.org](http://www.femise.org)



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